

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

API 47-017-06890 County Doddridge District West Union  
Quad Smithburg 7.5' Pad Name George Scott Pad Field/Pool Name -----  
Farm name George S. Wyckoff Well Number Cortina 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 4350949m Easting 523004m  
Landing Point of Curve Northing 4351578.25m Easting 523203.26m  
Bottom Hole Northing 4354483m Easting 522316m

Elevation (ft) 1283' 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 and Gas  
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 6/25/2019 Date drilling commenced 10/7/2019 Date drilling ceased 11/18/2019  
Date completion activities began 2/2/2020 Date completion activities ceased 4/26/2020  
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 128', 433' Open mine(s) (Y/N) depths No  
Salt water depth(s) ft 596', 1750' Void(s) encountered (Y/N) depths No  
Coal depth(s) ft 450' Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No

Reviewed by:  
Silva

API 47-017 - 06890 Farm name George S. Wyckoff Well number Cortina 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"	561'	New	54#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2610'	New	36#, H-40	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	18595'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	7393'		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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	204 sx	15.6	1.18	244	0'	8 Hrs.
Surface	Class A	490 sx	15.6	1.19	402	0'	8 Hrs.
Coal							
Intermediate 1	Class A	885 sx	15.6	1.18	1047	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	798 sx (Lead) 3355sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.53 (Lead), 1.83 (Tail)	2819	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 21000' MD, 7500' TVD (BHL), 7502' (Deepest Point Drilled) Loggers TD (ft) 21000' MD  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 6980'

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

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_  
 Conductor - 0  
 Surface - 1 above guide shoe, 1 above insert float, 1 every 4th joint to surface  
 Intermediate - 1 above float joint, 1 above float collar, 1 every 4th joint to surface  
 Production - 1 above float joint, 1 below float collar, 1 every 3rd joint to top of cement

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED N/A

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API 47- 017 - 06890 Farm name George S. Wyckoff Well number Cortina Unit 2H

PERFORATION RECORD

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

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 (bbls)	Amount of Nitrogen/other (units)
<b>*PLEASE SEE ATTACHED EXHIBIT 2</b>								

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PRODUCING FORMATION(S)	DEPTHS		
Marcellus	6952' (TOP)	TVD	7441' (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 8221 mcfpd Oil 82 bpd NGL --- bpd Water 125 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 <sub>2</sub> 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 Frontier Drilling LLC  
Address 562 Spring Run Road City Pennsboro State WV Zip 26415

Logging Company Nine Energy Services  
Address 125 Museum Road City Washington State PA Zip 15301

Cementing Company C&J Energy Services  
Address 1650 Hackers Creek City Jane Lew State WV Zip 26378

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

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Please insert additional pages as applicable.

Completed by Megan Griffith Telephone 303-357-7223  
Signature [Signature] Title Permitting Agent Date 1/21/20

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

API 47-017-06890 Farm Name <u>George S. Wyckoff</u> Well Number <u>Cortina Unit 2H</u>					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	2/2/2020	18487.8	18443.1	60	Marcellus
2	2/2/2020	18405.708	18241.748	60	Marcellus
3	2/2/2020	18206.556	18042.596	60	Marcellus
4	2/3/2020	18007.404	17843.444	60	Marcellus
5	2/3/2020	17808.252	17644.292	60	Marcellus
6	2/6/2020	17609.1	17445.14	60	Marcellus
7	2/6/2020	17409.948	17245.988	60	Marcellus
8	2/6/2020	17210.796	17046.836	60	Marcellus
9	2/6/2020	17011.644	16847.684	60	Marcellus
10	2/7/2020	16812.492	16648.532	60	Marcellus
11	2/7/2020	16613.34	16449.38	60	Marcellus
12	2/7/2020	16414.188	16250.228	60	Marcellus
13	2/7/2020	16215.036	16051.076	60	Marcellus
14	2/8/2020	16015.884	15851.924	60	Marcellus
15	2/8/2020	15816.732	15652.772	60	Marcellus
16	2/9/2020	15617.58	15453.62	60	Marcellus
17	2/9/2020	15418.428	15254.468	60	Marcellus
18	2/9/2020	15219.276	15055.316	60	Marcellus
19	2/9/2020	15020.124	14856.164	60	Marcellus
20	2/9/2020	14820.972	14657.012	60	Marcellus
21	2/10/2020	14621.82	14457.86	60	Marcellus
22	2/10/2020	14422.668	14258.708	60	Marcellus
23	2/10/2020	14223.516	14059.556	60	Marcellus
24	2/10/2020	14024.364	13860.404	60	Marcellus
25	2/10/2020	13825.212	13661.252	60	Marcellus
26	2/11/2020	13626.06	13462.1	60	Marcellus
27	2/11/2020	13426.908	13262.948	60	Marcellus
28	2/11/2020	13227.756	13063.796	60	Marcellus
29	2/11/2020	13028.604	12864.644	60	Marcellus
30	2/12/2020	12829.452	12665.492	60	Marcellus
31	2/12/2020	12630.3	12466.34	60	Marcellus
32	2/12/2020	12431.148	12267.188	60	Marcellus
33	2/12/2020	12231.996	12068.036	60	Marcellus
34	2/13/2020	12032.844	11868.884	60	Marcellus
35	2/13/2020	11833.692	11669.732	60	Marcellus
36	2/13/2020	11634.54	11470.58	60	Marcellus
37	2/13/2020	11435.388	11271.428	60	Marcellus
38	2/14/2020	11236.236	11072.276	60	Marcellus
39	2/14/2020	11037.084	10873.124	60	Marcellus
40	2/14/2020	10837.932	10673.972	60	Marcellus
41	2/14/2020	10638.78	10474.82	60	Marcellus
42	2/14/2020	10439.628	10275.668	60	Marcellus
43	2/15/2020	10240.476	10076.516	60	Marcellus
44	2/15/2020	10041.324	9877.364	60	Marcellus
45	2/15/2020	9842.172	9678.212	60	Marcellus
46	2/15/2020	9643.02	9479.06	60	Marcellus
47	2/16/2020	9443.868	9279.908	60	Marcellus
48	2/16/2020	9244.716	9080.756	60	Marcellus
49	2/16/2020	9045.564	8881.604	60	Marcellus
50	2/16/2020	8846.412	8682.452	60	Marcellus
51	2/17/2020	8647.26	8483.3	60	Marcellus
52	2/17/2020	8448.108	8284.148	60	Marcellus
53	2/17/2020	8248.956	8084.996	60	Marcellus
54	2/17/2020	8049.804	7885.844	60	Marcellus
55	2/17/2020	7850.652	7686.692	60	Marcellus
56	2/17/2020	7651.5	7487.54	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	2/2/2020	83.31	8232	5468	3047	164720	4422.167	N/A
2	2/2/2020	84.66	8451	6050	3720	403660	7401.952	N/A
3	2/2/2020	85.9	8335	5618	3841	398440	7154.595	N/A
4	2/3/2020	84.88	8475	5653	3905	403920	7264.69	N/A
5	2/3/2020	85.8	8495	5935	3967	409540	7283.643	N/A
6	2/6/2020	85.01	8325	5652	3661	399500	7276.214	N/A
7	2/6/2020	84.46	8477	4762	3390	400960	7199.905	N/A
8	2/6/2020	85.28	8454	5973	3258	405340	7165.357	N/A
9	2/6/2020	82.4	8454	6180	3271	404580	7245.119	N/A
10	2/7/2020	85.41	8321	6258	3784	403120	7140.952	N/A
11	2/7/2020	85.72	8438	5742	3517	403880	7248.619	N/A
12	2/7/2020	84.66	8279	5491	3984	402760	9638.333	N/A
13	2/7/2020	84.2	8298	5861	4912	404360	7268.19	N/A
14	2/8/2020	85.48	8257	5679	4046	403580	7263.738	N/A
15	2/8/2020	85.72	8058	5407	4060	404640	7156.452	N/A
16	2/9/2020	84.64	8311	6010	3557	400580	7110.69	N/A
17	2/9/2020	85.08	8255	7130	3582	407700	7159.786	N/A
18	2/9/2020	85.27	8091	5514	3760	400260	7126.381	N/A
19	2/9/2020	85.08	7760	5087	3828	402200	7171.619	N/A
20	2/9/2020	84.46	8231	4931	4119	408500	7320.762	N/A
21	2/10/2020	85.08	7880	5770	4043	399120	7085.476	N/A
22	2/10/2020	85.36	7796	5535	3790	403180	7058.214	N/A
23	2/10/2020	84.99	8346	5311	4140	398500	6998.214	N/A
24	2/10/2020	84.56	8409	5750	3742	401560	7113.714	N/A
25	2/10/2020	85.23	8363	6391	3568	403760	7112.833	N/A
26	2/11/2020	85.63	8201	5649	3704	403180	6948.929	N/A
27	2/11/2020	83.73	8130	5858	3870	403720	7037.048	N/A
28	2/11/2020	84.93	8302	5356	3782	403620	7076.738	N/A
29	2/11/2020	85.77	8279	5668	3816	404060	7101.405	N/A
30	2/12/2020	85.88	8305	5252	3895	404130	7014.476	N/A
31	2/12/2020	83.21	8164	5326	3559	405040	7003.952	N/A
32	2/12/2020	85.43	8220	5360	3880	408200	7012.524	N/A
33	2/12/2020	85.57	8322	7485	3857	407680	7030.452	N/A
34	2/13/2020	85.86	8126	5177	3835	409980	6965.69	N/A
35	2/13/2020	84.38	7973	5528	3877	406060	7069.524	N/A
36	2/13/2020	84.47	7960	5443	3904	416320	7036.31	N/A
37	2/13/2020	85.32	8242	5713	3880	405720	6972.571	N/A
38	2/14/2020	85.71	8129	5247	4092	410680	7099	N/A
39	2/14/2020	85.84	8171	4996	3838	409000	6937.643	N/A
40	2/14/2020	84.36	8218	5335	4058	408460	6966.214	N/A
41	2/14/2020	84.32	8113	5407	3798	408520	6972	N/A
42	2/14/2020	85.84	8361	5615	3909	403300	6867.595	N/A
43	2/15/2020	85.98	8216	5310	3945	405320	6756.119	N/A
44	2/15/2020	85.05	7953	5005	3967	408860	7504.738	N/A
45	2/15/2020	84.7	7991	5490	3932	405580	7035.381	N/A
46	2/15/2020	85.83	8214	5269	3898	405980	6858.595	N/A
47	2/16/2020	85.79	8233	5145	4174	405720	6816.69	N/A
48	2/16/2020	85.44	8244	5413	3926	406680	6781.905	N/A
49	2/16/2020	85.31	7683	5443	4023	405740	6744.238	N/A
50	2/16/2020	85.83	7926	5678	4020	404600	6861.81	N/A
51	2/17/2020	85.81	7622	5451	3863	404760	6689.929	N/A
52	2/17/2020	84.68	7686	5777	3824	407140	6796.476	N/A
53	2/17/2020	85.09	7478	5373	3866	401860	6803.048	N/A
54	2/17/2020	85	7289	5255	3991	408140	6910.881	N/A
55	2/17/2020	85.85	7342	5085	3842	405840	6675.071	N/A
56	2/17/2020	85.82	6853	5614	3545	400340	6608.548	N/A
	AVG=	85.0	8,235	5,658	3,808	16,352,730	291,632	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
Sandstone	100	300	100	300
Siltstone	300	580	300	580
Limestone	580	600	580	600
Shaly Siltstone	600	720	600	720
Shaly Limestone	720	800	720	800
Siltstone w/ trace coal	800	870	800	870
Shale	870	980	870	980
Silty Sandstone	980	1,040	980	1,040
Limestone w/ trace coal	1,040	1,080	1,040	1,080
Shaly Sandstone	1,080	1,350	1,080	1,350
Sandstone w/ interbedded co	1,350	1,820	1,350	1,820
Shale	1,820	2,020	1,820	2,020
Limestone	2,020	2,120	2,020	2,120
Sandy Shale	2,120	2,175	2,120	2,180
Big Lime	2,175	2,779	2,155	2,784
Fifty Foot Sandstone	2,779	2,871	2,759	2,877
Gordon	2,871	3,147	2,852	3,156
Fifth Sandstone	3,147	3,347	3,131	3,363
Bayard	3,347	3,989	3,338	4,056
Speechley	3,989	4,280	4,031	4,368
Balltown	4,280	4,684	4,343	4,803
Bradford	4,684	5,190	4,778	5,340
Benson	5,190	5,482	5,315	5,652
Alexander	5,482	6,736	5,627	7,039
Sycamore	6,491	6,711	6,745	7,014
Middlesex	6,711	6,856	7,014	7,226
Burkett	6,856	6,885	7,226	7,282
Tully	6,885	6,952	7,282	7,441
Marcellus	6,952	NA	7,441	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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## Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/2/2020
Job End Date:	2/17/2020
State:	West Virginia
County:	Doddridge
API Number:	47-017-06890-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Cortina 2H
Latitude:	39.30754000
Longitude:	-80.73335000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	7,094
Total Base Water Volume (gal):	17,259,542
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
Produced Mixture	Halliburton	Base Fluid					
			Water	7732-18-5	100.00000	86.57143	Density = 8.50
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.16745	



Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant					
				Listed Below			
HAI-501	Halliburton	Acid Corrosion Inhibitor					
				Listed Below			
Legend LD-2555	MultiChem	Additive					
				Listed Below			
Legend LD-2990	MultiChem	Friction Reducer					
				Listed Below			
OPTIFLO-II DELAYED RELEASE BREAKER	Halliburton	Breaker					
				Listed Below			
MC B-8614	Halliburton	Biocide					
				Listed Below			
LD-2950	MultiChem	Friction Reducer					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			

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HYDROCHLORIC ACID, 22 BAUME	Halliburton	Solvent					
				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	13.23750	
			Hydrochloric acid	7647-01-0	30.00000	0.04052	
			Complex Amine Compound	Proprietary	60.00000	0.01237	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01205	
			Complex Amine Compound	Proprietary	60.00000	0.01174	
			Guar gum	9000-30-0	100.00000	0.00345	
			Glutaraldehyde	111-30-8	30.00000	0.00248	
			Polyethoxylated fatty amine salt	61791-26-2	30.00000	0.00113	
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8	5.00000	0.00103	
			Surfactant	Proprietary	5.00000	0.00103	
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00041	
			Methanol	67-56-1	100.00000	0.00032	
			Organic chloride compound	Proprietary	1.00000	0.00021	
			Ethoxylated alcohols	Proprietary	1.00000	0.00021	
			Alkoxylated polyhydric alcohol	Proprietary	1.00000	0.00021	
			Adipic acid	124-04-9	1.00000	0.00020	
			Ethoxylated alcohols	Proprietary	1.00000	0.00020	
			Poly(oxy-1,2-ethanediyl), alpha-tridecyl-omega-hydroxy-, branched	69011-36-5	1.00000	0.00020	
			Ammonium persulfate	7727-54-0	100.00000	0.00009	
			Ethanol	64-17-5	1.00000	0.00008	

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			Mixture of dimer and trimer fatty acids of indefinite composition derived from tall oil	61790-12-3	30.00000	0.00007	
			Modified thiourea polymer	Proprietary	30.00000	0.00007	
			Oxylated phenolic resin	Proprietary	30.00000	0.00003	
			Organic salt #1	Proprietary	0.10000	0.00002	
			Acrylamide	79-06-1	0.10000	0.00002	
			Ethoxylated alcohols	Proprietary	5.00000	0.00001	
			Propargyl alcohol	107-19-7	5.00000	0.00001	
			Hexadecene	629-73-2	5.00000	0.00001	
			Phosphoric acid	7664-38-2	0.10000	0.00001	
			Organic salt #3	Proprietary	0.01000	0.00000	
			Formaldehyde	50-00-0	0.01000	0.00000	
			Sodium hydroxide	1310-73-2	0.01000	0.00000	
			Organic salt #2	Proprietary	0.01000	0.00000	
			Sodium glycollate	2836-32-0	0.01000	0.00000	
			Nitrated acetate salt	Proprietary	0.01000	0.00000	
			C.I. pigment Orange 5	3468-63-1	1.00000	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)

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 Office of Oil and Gas  
 OCT 28 2020  
 WV Department of  
 Environmental Protection



# ANTERO RESOURCES CORPORATION

Location: Doddridge Co., WV  
 Field: Doddridge  
 Facility: George Scott Pad

Slot: Slot #08  
 Well: Cortina Unit 2H  
 Wellbore: Cortina Unit 2H PWB



API: 47-017-06890-0000  
 BHI Job #: 110072950B  
 Rig: H&P 317  
 Duration: 10/08/2019-11/16/2019

Scale 1 inch = 2000  
 Easting (ft)  
 -3750 -2500 -1250 0 1250 2500

Projected MD at TD: 18615' : 7097.64ft TVD, 11143.40ft N, 2050.07ft W

Plot reference wellpath in Cortina Unit 2H PWP Rev-B.0	Grid System: NAD27 / UTM Zone 17 North, US feet
True vertical depths are referenced to H&P 317 (RKB)	North Reference: Grid north
Reference wellpath measured depths are referenced to H&P 317 (RKB)	Scale: True distance
H&P 317 (RKB) to Mean Sea Level: 1308.5 feet	Coordinates are in feet referenced to Slot
Mean Sea Level to Ground level (At Slot: Slot #08): +1293 feet	Depths are in feet
Offset wellpath MDs are referenced to each path's default MD datum	Created by: cdelaney on 2019-11-20; Database: WA MPL, EasternUS Deth



Gyrodata MS Gyro <17-1/2">(100'-475') : 0.05° Inc, 100.00ft MD, 100.00ft TVD, -0.02ft VS

APS EM <12-1/4"> (475')(606'-2559') : 0.98° Inc, 606.00ft MD, 605.98ft TVD, -3.03ft VS

Location Information					
Facility Name		Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
George Scott Pad		1715804.693	14274033.228	39°18'27.2500"N	80°44'0.5480"W
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude
Slot #08	-10.71	38.55	1715843.230	14274022.520	39°18'27.1430"N
H&P 317 (RKB) to Ground level (At Slot: Slot #08)		25.5ft			
Mean Sea Level to Ground level (At Slot: Slot #08)		-1293ft			
H&P 317 (RKB) to Mean Sea Level		1308.5ft			

APS EM <8-3/4">(2559')(2644'-6918') : 2.35° Inc, 2644.00ft MD, 2638.92ft TVD, -89.25ft VS

Well Profile Data								
Design Comment	MD (ft)	Inc (")	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	2559.00	2.370	242.130	2553.99	-101.39	-28.66	0.54	-88.08
Proj. to Bottom	2630.00	2.370	242.130	2624.93	-102.76	-31.25	0.00	-88.61
Drill Out Csg / KOP 1	2730.00	2.370	242.130	2724.85	-104.69	-34.91	0.00	-89.35
Hold Tangent	3533.40	21.951	88.124	3510.41	-107.59	102.52	3.00	-133.43
Curve KOP	6484.74	21.951	88.124	6247.79	-71.47	1205.15	0.00	-430.56
POE	7441.43	89.353	342.502	6971.00	436.66	1257.27	8.00	41.24
Landing Pt.	7699.51	90.000	342.502	7017.00	690.50	1181.34	8.00	293.77
BH-L	16698.00	90.000	342.502	7017.00	11170.08	-2125.56	0.00	11292.28

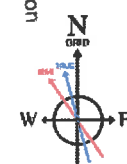
Well Data			
Slot	Well	Wellbore	Wellpath
Slot #08	Cortina Unit 2H	Cortina Unit 2H AAWB	Cortina Unit 2H AWP Proj: 18615'
Slot #08	Cortina Unit 2H	Cortina Unit 2H PWB	Cortina Unit 2H PWP Rev-B.0

BH AT Curve <8-1/2">(6918')(6963'-18591') : 38.14° Inc, 6963.00ft MD, 6677.11ft TVD, -266.18ft VS

Marcellus POE: 7466' MD : 69.91° Inc, 7466.00ft MD, 6978.06ft TVD, 121.86ft VS

Projected MD at TD: 18615' : 88.65° Inc, 18615.00ft MD, 7097.64ft TVD, 11244.12ft VS

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User specified (HDGM) Dip: 66.37° Field: 51940 nT  
 Magnetic North is 7.76 degrees West of True North (at 11/8/2019)  
 Grid North is 0.17 degrees East of True North  
 To correct azimuth from True to Grid subtract 0.17 degrees  
 To correct azimuth from Magnetic to Grid subtract 7.93 degrees

Marcellus POE: 7466' MD : 6978.06ft TVD, 516.06ft N, 1231.55ft E - POE: 130'

BH AT Curve <8-1/2">(6918')(6963'-18591') : 6677.11ft TVD, 130.40ft N, 1298.79ft E

Gyrodata MS Gyro <17-1/2">(100'-475') : 100.00ft TVD, 0.03ft S, 0.02ft W  
 APS EM <12-1/4"> (475')(606'-2559') : 605.98ft TVD, 3.78ft S, 1.93ft W  
 APS EM <8-3/4">(2559')(2644'-6918') : 2638.92ft TVD, 103.48ft S, 31.40ft W

Scale 1 inch = 1600  
 True Vertical Depth (ft)  
 -750  
 0  
 750  
 1500  
 2250  
 3000  
 3750  
 4500  
 5250  
 6000  
 6750

11250  
 10000  
 8750  
 7500  
 6250  
 5000  
 3750  
 2500  
 1250  
 0  
 -1250  
 Northing (ft)

Vertical Section (ft)  
 -750 0 750 1500 2250 3000 3750 4500 5250 6000 6750 7500 8250 9000 9750 10500 11250 12000  
 Scale 1 inch = 1500

Azimuth 342.50° with reference 0.00 N, 0.00 E

LATITUDE 39°20'00"

7,079'

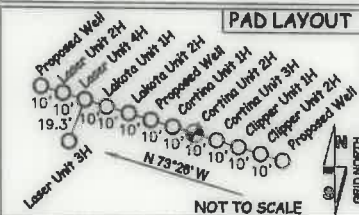
9,092' TO BOTTOM HOLE

LATITUDE 39°22'30"

Antero Resources Corporation  
Well No. Cortina Unit 2H

AS DRILLED DATA:  
WELL 2H TOP HOLE INFORMATION:  
N: 296,518ft E: 1,651,014ft  
LAT: 39°18'27.14" LON: 80°44'00.05"  
BOTTOM HOLE INFORMATION:  
N: 307,693ft E: 1,649,150ft  
LAT: 39°20'17.34" LON: 80°44'25.73"  
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: 4,350,949m E: 523,004m  
BOTTOM HOLE INFORMATION:  
N: 4,354,344m E: 522,380m



1 WATER WELL WAS LOCATED WITHIN 2000' OF CENTER OF PAD

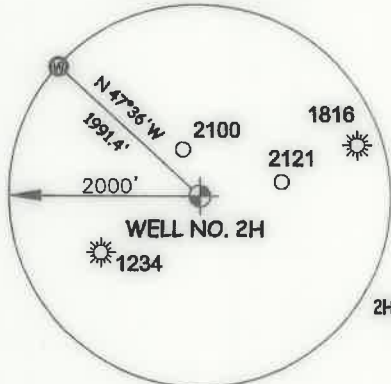


Table listing landowners and lease information for various parcels, including names like Samuel Hommett, Larry Williams, and various church trustees.

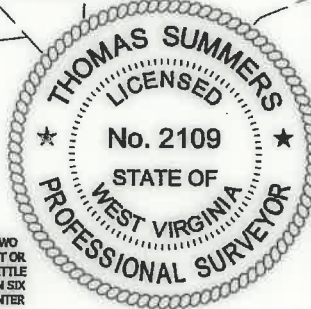
LONGITUDE 80°42'30" 13,422' TO BOTTOM HOLE LONGITUDE 80°42'30"

9,395' LONGITUDE 80°42'30"

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 # 18-033WA  
DRAWING # CORTINAZHAD  
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  
THOMAS SUMMERS P.S. 2109  
DATE 06/18/20  
OPERATOR'S WELL# CORTINA 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 47 017 06890  
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT  
LOCATION: ELEVATION 1283' -AS-BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK  
QUADRANGLE SMITHBURG 7.5' DISTRICT WEST UNION COUNTY DODDRIDGE  
SURFACE OWNER GEORGE S. WYCKOFF ACREAGE 104.27 ACRES +/-  
OIL & GAS ROYALTY OWNER V.B. CHAPMAN ET UX; JOHNSON B. SMITH ET UX; LEASE ACREAGE 156 ACRES±; 180 ACRES±;  
P.S. COWMAN ET UX; JOHNSON WILLIAMS; EDGAR DAVISSON ET UX; 105.93 ACRES±; 105.5 ACRES±; 230 ACRES±;  
GEORGE BENTON WHITE; R. B. WHITE HEIRS; C. HOWARD KNIGHT ET AL 75 ACRES±; 53 ACRES±; 54 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 7,097' TVD 18,615' 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

LATITUDE 39°20'00"

7,079'

9,092' TO BOTTOM HOLE

LATITUDE 39°22'30"

Antero Resources Corporation Well No. Cortina Unit 2H

AS DRILLED DATA: WELL 2H TOP HOLE INFORMATION: N: 296,518ft E: 1,651,014ft LAT: 39°18'27.14" LON: 80°44'00.05" BOTTOM HOLE INFORMATION: N: 307,693ft E: 1,649,150ft LAT: 39°20'17.34" LON: 80°44'25.73" 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: 4,350,949m E: 523,004m BOTTOM HOLE INFORMATION: N: 4,354,344m E: 522,380m

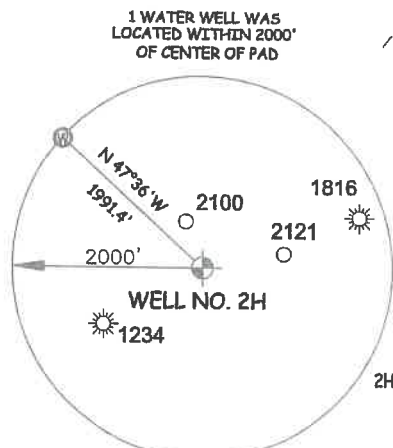
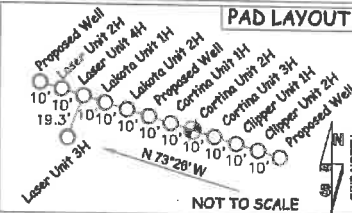


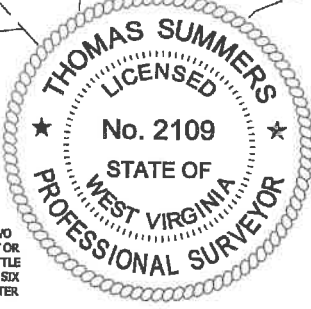
Table listing lease owners and well numbers. Includes names like Samuel Hammett, Larry Williams, Diana Knight, Worthy Underwood Jr., Lisa Nicholson, Roger Bacot, Diana Knight, Emeneo Sanchez, Charles Henderson, Lois Murphy, Larry Williams, Kelli Jett, Philip Williams, Lois Murphy, Jerry Chio, Red Oak Grove Church Trustees, Lorelei Phillips, Red Oak Grove Church Trustees, Steven Chipps, Steven Chipps, Steven Chipps, Diana Knight, Seth Every, Lorelei Phillips, Lorelei Phillips, Lorelei Phillips, Antero Resources Corporation, Antero Resources Corporation, Kiever Family Trust, Diana Bennell, Michael O'Brien, Antero Resources Corporation, Steven Chipps, Lisa Dara, Michael O'Brien, John Davis, Michael O'Brien, Sheila Hought, Brian Dara, Michael O'Brien, Michael O'Brien, Paul Smith, George Wyckoff, Robert Holland, John Smith, John Smith, John Smith, George Wyckoff.

LONGITUDE 80°42'30" 13,422' TO BOTTOM HOLE LONGITUDE 80°42'30"

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 # 18-033WA DRAWING # CORTINA2HAD 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. THOMAS SUMMERS P.S. 2109 DATE 06/18/20 OPERATOR'S WELL# CORTINA 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 47 017 06890 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT LOCATION: ELEVATION 1,283' AS-BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK QUADRANGLE SMITHBURG 7.5 DISTRICT WEST UNION COUNTY DODDRIDGE SURFACE OWNER GEORGE S. WYCKOFF ACREAGE 104.27 ACRES +/- LEASE ACREAGE 156 ACRES +/- 180 ACRES +/- OIL & GAS ROYALTY OWNER V.B. CHAPMAN ET UX; JOHNSON B. SMITH ET UX; P.S. COWMAN ET UX; JOHNSON WILLIAMS; EDGAR DAVISSON ET UX; GEORGE BENTON WHITE; R. B. WHITE HEIRS; C. HOWARD KNIGHT ET AL 105.93 ACRES +/- 105.5 ACRES +/- 230 ACRES +/- 75 ACRES +/- 53 ACRES +/- 54 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 7,097' TVD 18,615' 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