

WR-35
Rev. 8/23/13

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

API 47 - 095 - 02451 County Tyler District Centerville
 Quad Middlebourne 7.5' Pad Name Lemuel Pad Field/Pool Name -----
 Farm name Antero Resources Corporation Well Number Olive 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 4363666m Easting 507461m
 Landing Point of Curve Northing 4363771m Easting 507259m
 Bottom Hole Northing 4366382m Easting 506332m

Elevation (ft) 1155' 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 6/23/2017 Date drilling commenced 12/10/2017 Date drilling ceased 7/24/2018
 Date completion activities began 8/27/2018 Date completion activities ceased 10/15/2018
 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 None Identified Open mine(s) (Y/N) depths No
 Salt water depth(s) ft None Identified Void(s) encountered (Y/N) depths No
 Coal depth(s) ft 1328', 1468' Cavern(s) encountered (Y/N) depths No
 Is coal being mined in area (Y/N) No

Reviewed by:

WR-35
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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"	112'	New	78.67#, A252	N/A	Y
Surface	17-1/2"	13-3/8"	619'	New	54.5#, J-55	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2602'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	16434'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6811'		4.7#, L-80		
Packer type and depth set		N/A					

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	204 sx	15.6	1.18	241	0'	8 Hrs.
Surface	Class A	510 sx	15.6	1.20	612	0'	8 Hrs.
Coal							
Intermediate 1	Class A	900 sx	15.6	1.18	1062	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	710 sx (Lead) 1545 sx (Tail)	14.0 (Lead), 15.2 (Tail)	1.45 (Lead), 1.83 (Tail)	3857	~500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 16454' MD, 6503' TVD (BHL), 6594' (Deepest Point Drilled) Loggers TD (ft) 16454' MD

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

Plug back procedure N/A

Kick off depth (ft) 5823'

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

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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Marcellus	6534' (TOP) TVD	6870' (TOP) MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 4100 psi Bottom Hole --- psi DURATION OF TEST --- hrs

OPEN FLOW Gas 12786 mcfpd Oil 352 bpd NGL --- bpd Water 680 bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	

***PLEASE SEE ATTACHED EXHIBIT 3**

Please insert additional pages as applicable.

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

Logging Company Reach Wireline
Address 100 Nu Energy Drive, Suite 1 City Aledo State TX Zip 76008

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

Stimulating Company US Well Services
Address 535 Industrial Park Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by Karin Cox Telephone 303-357-7223
Signature *Karin Cox* Title Permitting Agent Date 2/28/2019

API 47-095-02451 Farm Name Antero Resources Corporation Well Number Olive Unit 2H					
EXHIBIT 1					
Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	8/27/2018	16224.6	16329	24	Marcellus
2	8/27/2018	16026.672	16193.612	48	Marcellus
3	8/28/2018	15828.744	15995.684	48	Marcellus
4	8/28/2018	15630.816	15797.756	48	Marcellus
5	8/28/2018	15432.888	15599.828	48	Marcellus
6	8/29/2018	15234.96	15401.9	48	Marcellus
7	8/29/2018	15037.032	15203.972	48	Marcellus
8	8/29/2018	14839.104	15006.044	48	Marcellus
9	8/30/2018	14641.176	14808.116	48	Marcellus
10	8/30/2018	14443.248	14610.188	48	Marcellus
11	8/30/2018	14245.32	14412.26	48	Marcellus
12	8/31/2018	14047.392	14214.332	48	Marcellus
13	8/31/2018	13849.464	14016.404	48	Marcellus
14	8/31/2018	13651.536	13818.476	48	Marcellus
15	8/31/2018	13453.608	13620.548	48	Marcellus
16	9/1/2018	13255.68	13422.62	48	Marcellus
17	9/1/2018	13057.752	13224.692	48	Marcellus
18	9/1/2018	12859.824	13026.764	48	Marcellus
19	9/2/2018	12661.896	12828.836	48	Marcellus
20	9/2/2018	12463.968	12630.908	48	Marcellus
21	9/2/2018	12266.04	12432.98	48	Marcellus
22	9/2/2018	12068.112	12235.052	48	Marcellus
23	9/3/2018	11870.184	12037.124	48	Marcellus
24	9/3/2018	11672.256	11839.196	48	Marcellus
25	9/3/2018	11474.328	11641.268	48	Marcellus
26	9/3/2018	11276.4	11443.34	48	Marcellus
27	9/4/2018	11078.472	11245.412	48	Marcellus
28	9/4/2018	10880.544	11047.484	48	Marcellus
29	9/4/2018	10682.616	10849.556	48	Marcellus
30	9/4/2018	10484.688	10651.628	48	Marcellus
31	9/5/2018	10286.76	10453.7	48	Marcellus
32	9/5/2018	10088.832	10255.772	48	Marcellus
33	9/5/2018	9890.904	10057.844	48	Marcellus
34	9/5/2018	9692.976	9859.916	48	Marcellus
35	9/6/2018	9495.048	9661.988	48	Marcellus
36	9/6/2018	9297.12	9464.06	48	Marcellus
37	9/7/2018	9099.192	9266.132	48	Marcellus
38	9/7/2018	8901.264	9068.204	48	Marcellus
39	9/7/2018	8703.336	8870.276	48	Marcellus
40	9/7/2018	8505.408	8672.348	48	Marcellus
41	9/8/2018	8307.48	8474.42	48	Marcellus
42	9/8/2018	8109.552	8276.492	48	Marcellus
43	9/9/2018	7911.624	8078.564	48	Marcellus
44	9/9/2018	7713.696	7880.636	48	Marcellus
45	9/9/2018	7515.768	7682.708	48	Marcellus
46	9/10/2018	7317.84	7484.78	48	Marcellus
47	9/10/2018	7119.912	7286.852	48	Marcellus
48	9/10/2018	6921.984	7088.924	48	Marcellus

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EXHIBIT 2								
Stage No.	Stimulations Date	Avg Pump Rate	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbbls)	Amount of Nitrogen/ other (units)
1	8/27/2018	74.443	7022.017	7136	5086	269760	7350	N/A
2	8/27/2018	79.4403	7100.067	4437	5383	394620	8647	N/A
3	8/28/2018	79.4013	7360.895	5262	3887	409590	8023	N/A
4	8/28/2018	73.2323	7286.106	5432	4246	396860	8013	N/A
5	8/28/2018	72.7631	7414.5	5146	3667	395900	8471	N/A
6	8/29/2018	77.2	7672.782	5281	3578	397840	7824	N/A
7	8/29/2018	70.4626	7265.981	4903	3668	397780	7765	N/A
8	8/29/2018	70.8622	7539.171	5496	3479	396840	7912	N/A
9	8/30/2018	72.9497	7397.346	5261	3828	393245	7796	N/A
10	8/30/2018	73.4197	7459.693	5930	3589	397380	7894	N/A
11	8/30/2018	75.5735	7485.008	5776	3935	398920	7768	N/A
12	8/31/2018	76.4635	7379.94	5196	3916	399660	7763	N/A
13	8/31/2018	74.2454	7115.536	6231	3426	396660	7873	N/A
14	8/31/2018	76.8435	7244.528	5497	3816	397040	7856	N/A
15	8/31/2018	77.6647	7487.369	5919	3898	396320	7838	N/A
16	9/1/2018	78.6304	7560.112	6057	3521	398020	7850	N/A
17	9/1/2018	76.7949	7339.614	6208	3385	395460	7808	N/A
18	9/1/2018	77.9237	7499.728	6381	3702	396700	7823	N/A
19	9/2/2018	77.3166	7369.806	6388	3676	394600	7825	N/A
20	9/2/2018	77.6638	7060.178	6102	3304	397900	7809	N/A
21	9/2/2018	77.2517	7121.941	6284	3651	397440	7813	N/A
22	9/2/2018	77.322	7078.432	5846	3796	396520	7685	N/A
23	9/3/2018	78.909	7039.397	5467	3671	394420	7683	N/A
24	9/3/2018	79.3183	7009.674	5602	3977	392940	7773	N/A
25	9/3/2018	77.334	6971.562	5941	3460	394420	7757	N/A
26	9/3/2018	78.747	6901.647	6028	3559	393700	7657	N/A
27	9/4/2018	77.3981	6969.115	6351	3660	395880	7742	N/A
28	9/4/2018	77.8818	6985.976	5115	4491	395230	7734	N/A
29	9/4/2018	80.7	7410.925	6192	3744	395560	7744	N/A
30	9/4/2018	80.2484	7298.675	5611	4755	397140	7724	N/A
31	9/5/2018	76.3994	6973.619	6642	3978	395900	7706	N/A
32	9/5/2018	77.1263	6945.697	5494	4201	397020	7700	N/A
33	9/5/2018	78.3455	7103.516	5870	3913	394480	7690	N/A
34	9/5/2018	78.0648	6926.148	5741	3445	396060	7682	N/A
35	9/6/2018	79.7724	6699.673	6265	3673	393760	7575	N/A
36	9/6/2018	79.1224	6988.218	6004	3904	393920	10554	N/A
37	9/7/2018	80.2	7203.94	6364	3322	396060	7662	N/A
38	9/7/2018	78.4583	6871.535	6125	3850	399080	7549	N/A
39	9/7/2018	79.5814	6907.014	6156	3560	396600	8658	N/A
40	9/7/2018	76.749	6882.863	6473	3476	398020	7532	N/A
41	9/8/2018	79.9869	6803.786	5924	4110	398660	7518	N/A
42	9/8/2018	80.4312	6660.926	5917	4198	396080	7524	N/A
43	9/9/2018	78.5585	6911.91	5194	3782	395140	7620	N/A
44	9/9/2018	79.0057	7093.281	6316	4196	394400	7497	N/A
45	9/9/2018	79.43	6924.224	6243	3758	395440	7490	N/A
46	9/10/2018	77.7547	6664.671	7166	3591	396080	7496	N/A
47	9/10/2018	65.1086	7249.87	4285	3284	396740	8823	N/A
48	9/10/2018	78.3542	6608.412	6244	3449	397840	7555	N/A
AVG=		77	7,131	5,852	3,822	18,905,625	377,051	TOTAL

API 47-095-02451 Farm Name Antero Resources Corporation Well Number Olive Unit 2H				
EXHIBIT 3				
LITHOLOGY/ FORMATION	TOP DEPTH (TVD) From Surface	BOTTOM DEPTH (TVD) From Surface	TOP DEPTH (MD) From Surface	BOTTOM DEPTH (MD) From Surface
Sandstone	0	528	0	528
Silty sandstone	est. 528	568	est. 528	568
Sandy siltstone	est. 568	608	est. 568	608
Silty shale	est. 608	688	est. 608	688
Calcareous shale	est. 688	788	est. 688	788
Shaly siltstone	est. 788	848	est. 788	848
Silty Marlstone	est. 848	948	est. 848	948
Calcareous shale	est. 948	1,008	est. 948	1,008
Sandy siltstone	est. 1008	1,088	est. 1008	1,088
Calcareous shale	est. 1088	1,328	est. 1088	1,328
Coal / shale	est. 1328	1,468	est. 1328	1,468
Sandy shale/coal	est. 1468	1,908	est. 1468	1,908
Sandy siltstone	est. 1908	1,998	est. 1908	1,998
Big Lime	1,998	2,195	1,998	2,195
Big Injun	2,195	2,671	2,195	2,672
Gantz Sand	2,671	2,813	2,672	2,813
Fifty Foot Sandstone	2,813	2,939	2,813	2,940
Gordon	2,939	3,101	2,940	3,103
Fifth Sandstone	3,101	3,386	3,103	3,392
Bayard	3,386	3,691	3,392	3,701
Warren	3,691	4,079	3,701	4,099
Speechley	4,079	4,305	4,099	4,330
Balltown	4,305	4,689	4,330	4,723
Bradford	4,689	4,986	4,723	5,027
Benson	4,986	5,387	5,027	5,387
Alexander	5,387	5,894	5,387	5,953
Rhinestreet	5,894	6,252	5,953	6,336
Sycamore	6,252	6,392	6,336	6,529
Middlesex	6,392	6,482	6,529	6,717
Burkett	6,482	6,508	6,717	6,788
Tully	6,508	6,534	6,788	6,870
Marcellus	6,534	N/A	6,870	N/A

*Please note Antero determines formation tops based on mud logs that are only run on one well on a multi-well pad. The measured depth (MD) data on subsequent wells may be slightly different due to the well's unique departure.

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/27/2018
Job End Date:	9/10/2018
State:	West Virginia
County:	Tyler
API Number:	47-095-02451-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Olive 2H
Latitude:	39.42240800
Longitude:	-80.91349200
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,594
Total Base Water Volume (gal):	15,836,142
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
Water	Antero Resources	Carrier/Base Fluid	Water	7732-18-5	100.00000	87.24779	
Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	12.48845	
HCL Acid (12.6%-17.5%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.40000	0.14672	
			Hydrogen Chloride	7647-01-0	17.50000	0.03411	
LGC-15	J.S. Well Services, LLC	Gelling Agents	Guar Gum	9000-30-0	50.00000	0.02130	
			Petroleum Distillates	64742-47-8	60.00000	0.02017	
			Suspending agent (solid)	14808-60-7	3.00000	0.00326	
			Surfactant	68439-51-0	3.00000	0.00128	
WFRA-405	J.S. Well Services, LLC	Friction Reducer	2-Propanoic acid, polymer with 2-propanamide	29003-06-9	30.00000	0.01462	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01177	

Bioclear 2000	J.S. Well Services, LLC	Anti-Bacterial Agent						
			2,2-dibromo-3-nitropropionamide	10222-01-2	20.00000	0.00447		
			Deionized Water	7732-18-5	28.00000	0.00255		
SI-1200s	J.S. Well Services, LLC	Scale Inhibitor						
			Proprietary Scale Inhibitor	Proprietary	10.00000	0.00133		
AP One	J.S. Well Services, LLC	Gel Breakers						
			Ammonium Persulfate	7727-54-0	100.00000	0.00107		
AI-303	J.S. Well Services, LLC	Acid Corrosion Inhibitors						
			Ethylene glycol	107-21-1	40.00000	0.00005		
			Formic acid	64-18-6	20.00000	0.00002		
			Cinnamaldehyde	104-55-2	20.00000	0.00002		
			Butyl cellosolve	111-76-2	20.00000	0.00002		
			Polyether	60828-78-6	10.00000	0.00001		
			Acetophenone, thiourea, formaldehyde polymer	68527-49-1	5.00000	0.00000		

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

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

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°27'30"

10,874'

LATITUDE 39°27'30"

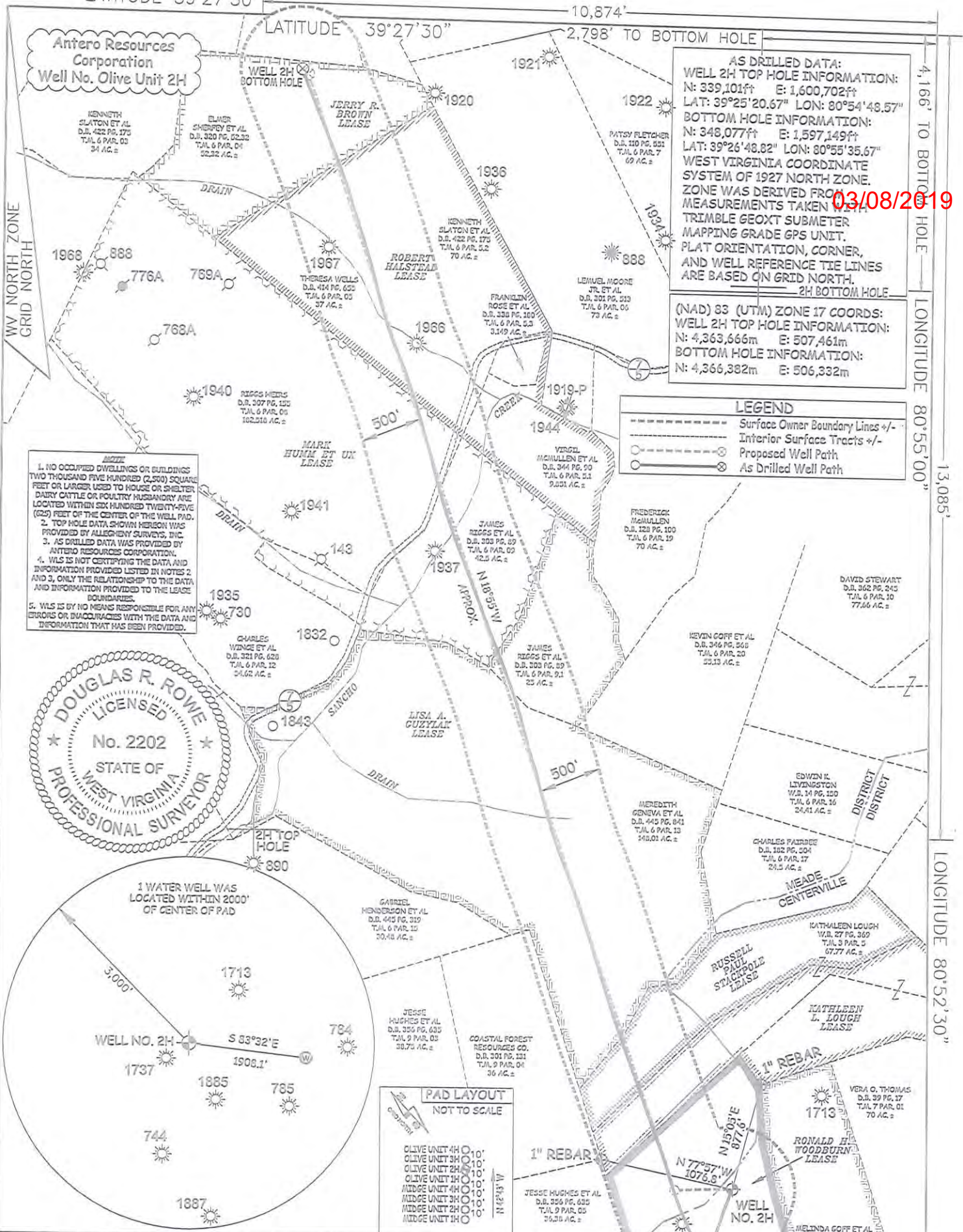
2,798' TO BOTTOM HOLE

4,166' TO BOTTOM HOLE

LONGITUDE 80°55'00"

13,085'

LONGITUDE 80°52'30"



DOUGLAS R. ROWE
 LICENSED
 No. 2202
 STATE OF WEST VIRGINIA
 PROFESSIONAL SURVEYOR

JOB # 16-049WA
 DRAWING # OLIVE2HAD
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY SUBMETER
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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

DOUGLAS R. ROWE P.S. 2202
 DATE 01/21/19
 OPERATOR'S WELL# OLIVE UNIT#2H
 47 - 095 - 02451

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 LOCATION: ELEVATION 1,155' AS BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE MIDDLEBOURNE 7.5' DISTRICT CENTERVILLE COUNTY TYLER
 SURFACE OWNER ANTERO RESOURCES CORPORATION ACREAGE 77.73 ACRES +/-
 OIL & GAS ROYALTY OWNER RONALD H. WOODBURN; KATHLEEN L. LOUGH; RUSSELL PAUL STACKPOLE; LEASE ACREAGE 94 AC.; 40.27 AC.; 27.5 AC.;
 LISA A. GUZYLAK; MARK HUMM ET UX; ROBERT HALSTEAD; JERRY R BROWN 149.29 AC.; 166.83 AC.; 119 AC.; 52.32 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 6,503' TVD 16,454' MD
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP ST. ADDRESS 5400 D BIG TYLER ROAD
 DENVER, CO 80202 CHARLESTON, WV 25313

03/08/2019