

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

API 47-095-02391 County Tyler District Meade
Quad Pennsboro 7.5' Pad Name Ritchie Petroleum Pad Field/Pool Name -----
Farm name David M. Hartley Well Number Packers 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 4356641m Easting 502125m
Landing Point of Curve Northing 4356712.44m Easting 501890.82m
Bottom Hole Northing 4359701m Easting 500734m

Elevation (ft) 1176' 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 12/27/2016 Date drilling commenced _____ Date drilling ceased _____
Date completion activities began _____ Date completion activities ceased _____
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 162', 201', 577' Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1293' 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

APPROVED

Reviewed by: Stumpy
6/2/23

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Environmental Protection

API 47-095 - 02391 Farm name David M. Hartley Well number Packers 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"	65'	New	94#, H-40	N/A	Y
Surface	17-1/2"	13-3/8"	496'	New	48#, H-40	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2488'	New	36#, J-55	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-3/4"/8-1/2"	5-1/2"	16055'	New	23#, P-110	N/A	Y
Tubing		2-3/8"	6532'		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 ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	102 sx	15.6	1.18	120	0'	8 Hrs.
Surface	Class A	605 sx	15.6	1.18	826	0'	8 Hrs.
Coal							
Intermediate 1	Class A	907 sx	15.6	1.18	1181	0'	8 Hrs.
Intermediate 2							
Intermediate 3							
Production	Class H	798 sx (Lead) 1333 sx (Tail)	13.5 (Lead), 15.2 (Tail)	1.44 (Lead), 1.87 (Tail)	3774	-500' into Intermediate Casing	8 Hrs.
Tubing							

Drillers TD (ft) 16055' MD, 6459' TVD (BHL), 6462' (Deepest Point Drilled) Loggers TD (ft) 16055' MD
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6013'

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

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

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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

SM

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

Please insert additional pages as applicable.

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EXHIBIT 1

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	5/8/2018	17391		60	Marcellus
2	5/8/2018	17189	17359	60	Marcellus
3	5/8/2018	16988	17158	60	Marcellus
4	5/9/2018	16786	16956	60	Marcellus
5	5/9/2018	16584	16754	60	Marcellus
6	5/10/2018	16383	16553	60	Marcellus
7	5/10/2018	16181	16351	60	Marcellus
8	5/11/2018	15979	16149	60	Marcellus
9	5/11/2018	15778	15948	60	Marcellus
10	5/12/2018	15576	15746	60	Marcellus
11	5/13/2018	15374	15544	60	Marcellus
12	5/13/2018	15173	15343	60	Marcellus
13	5/13/2018	14971	15141	60	Marcellus
14	5/14/2018	14769	14939	60	Marcellus
15	5/14/2018	14568	14738	60	Marcellus
16	5/14/2018	14366	14536	60	Marcellus
17	5/14/2018	14164	14334	60	Marcellus
18	5/15/2018	13963	14133	60	Marcellus
19	5/15/2018	13761	13931	60	Marcellus
20	5/15/2018	13559	13730	60	Marcellus
21	5/16/2018	13358	13528	60	Marcellus
22	5/16/2018	13156	13326	60	Marcellus
23	5/17/2018	12954	13125	60	Marcellus
24	5/18/2018	12753	12923	60	Marcellus
25	5/19/2018	12551	12721	60	Marcellus
26	5/20/2018	12349	12520	60	Marcellus
27	5/21/2018	12148	12318	60	Marcellus
28	5/21/2018	11946	12116	60	Marcellus
29	5/22/2018	11745	11915	60	Marcellus
30	5/23/2018	11543	11713	60	Marcellus
31	5/23/2018	11341	11511	60	Marcellus
32	5/24/2018	11140	11310	60	Marcellus
33	5/25/2018	10938	11108	60	Marcellus
34	5/25/2018	10736	10906	60	Marcellus
35	6/2/2018	10535	10705	60	Marcellus
36	6/2/2018	10333	10503	60	Marcellus
37	6/2/2018	10131	10301	60	Marcellus
38	6/3/2018	9930	10100	60	Marcellus
39	6/3/2018	9728	9898	60	Marcellus
40	6/3/2018	9526	9696	60	Marcellus
41	6/4/2018	9325	9495	60	Marcellus
42	6/4/2018	9123	9293	60	Marcellus
43	6/4/2018	8921	9091	60	Marcellus
44	6/4/2018	8720	8890	60	Marcellus
45	6/5/2018	8518	8688	60	Marcellus
46	6/5/2018	8316	8486	60	Marcellus
47	6/5/2018	8115	8285	60	Marcellus
48	6/5/2018	7913	8083	60	Marcellus
49	6/6/2018	7711	7881	60	Marcellus
50	6/6/2018	7510	7680	60	Marcellus
51	6/6/2018	7308	7478	60	Marcellus
52	6/6/2018	7106	7276	60	Marcellus
53	6/7/2018	6905	7075	60	Marcellus
54	6/7/2018	6703	6873	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	5/8/2018	72.4	7845	5419	2672	199980	11227	N/A
2	5/8/2018	75.4	7707	4699	3117	425470	11431	N/A
3	5/8/2018	76.3	7473	4170	3798	419930	10943	N/A
4	5/9/2018	78.1	7486	5994	3144	416480	9540	N/A
5	5/9/2018	76.8	7364	4266	3637	426390	9586	N/A
6	5/10/2018	77.1	7350	5125	3144	409840	9261	N/A
7	5/10/2018	75.7	7316	4559	4022	418830	9434	N/A
8	5/11/2018	74.6	7649	5696	3701	408680	11149	N/A
9	5/11/2018	77.3	7404	5154	3458	413640	9715	N/A
10	5/12/2018	76.2	7123	5579	3713	426270	9495	N/A
11	5/13/2018	78.4	7180	4981	3535	420990	9473	N/A
12	5/13/2018	78.9	7427	5089	3559	427430	9432	N/A
13	5/13/2018	77.6	7070	5429	3494	428670	9584	N/A
14	5/14/2018	76.4	7081	5319	3443	409900	9318	N/A
15	5/14/2018	74.9	7020	4985	3375	412860	9332	N/A
16	5/14/2018	75.6	7142	5121	3383	425940	9545	N/A
17	5/14/2018	78	7198	4889	3423	421340	9452	N/A
18	5/15/2018	78	6981	4970	3302	426060	9501	N/A
19	5/15/2018	78.2	7014	4031	3265	420740	9401	N/A
20	5/15/2018	78.4	6932	4859	3755	422720	9537	N/A
21	5/16/2018	78.3	6870	5646	3710	423720	9567	N/A
22	5/16/2018	76.1	6734	4486	3609	426130	9740	N/A
23	5/17/2018	77.9	7057	4337	3822	419410	9518	N/A
24	5/18/2018	75.6	7342	5423	3884	425790	10150	N/A
25	5/19/2018	76.7	6869	5164	3486	420190	9366	N/A
26	5/20/2018	75.5	7304	5503	3514	419670	12791	N/A
27	5/21/2018	76.5	6909	5648	3501	427030	9351	N/A
28	5/21/2018	77.4	6629	5251	3640	422440	9265	N/A
29	5/22/2018	75.7	6613	5303	4909	372574	9101	N/A
30	5/23/2018	78.3	6835	5380	3555	411456	9273	N/A
31	5/23/2018	75.9	6818	5444	3761	419890	9250	N/A
32	5/24/2018	77.3	6866	5422	3535	421460	9412	N/A
33	5/25/2018	79.6	6422	4905	3289	423020	9365	N/A
34	5/25/2018	76.8	6344	4086	3270	423390	9220	N/A
35	6/2/2018	76.7	6890	5278	3891	421600	9547	N/A
36	6/2/2018	78.7	6641	5136	3869	419420	9063	N/A
37	6/2/2018	75	6524	5035	4094	422570	9049	N/A
38	6/3/2018	77.8	6341	4953	4376	420790	9106	N/A
39	6/3/2018	76.2	6133	5073	3906	421030	9121	N/A
40	6/3/2018	76.5	6153	5064	4238	422320	9182	N/A
41	6/4/2018	76.7	6154	5682	4315	417940	8985	N/A
42	6/4/2018	79.5	6025	5256	3890	422940	8996	N/A
43	6/4/2018	79.3	5206	5206	3972	421180	9084	N/A
44	6/4/2018	76.4	6079	5417	4399	422820	8832	N/A
45	6/5/2018	76.7	6060	5648	3885	424300	8991	N/A
46	6/5/2018	78.4	6071	5593	3864	419230	8974	N/A
47	6/5/2018	78.1	6278	4661	4327	418930	9386	N/A
48	6/5/2018	76.1	6002	6002	4045	420530	9125	N/A
49	6/6/2018	77.6	6101	5980	3668	421770	8925	N/A
50	6/6/2018	78.5	6089	5020	3844	423300	8902	N/A
51	6/6/2018	78.7	6180	5927	3950	418380	8985	N/A
52	6/6/2018	78.7	6234	5937	4083	417720	8841	N/A
53	6/7/2018	78.5	5999	5607	3856	416660	8842	N/A
54	6/7/2018	78.1	5840	6237	3615	401100	8661	N/A
	AVG=	77.0	6,862	5,123	3,677	19,094,470	440,655	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
Shale w/intbd Sandstone and Lime	0	228	0	228
Sandy shale and coal	228	528	228	528
Sandy shale	528	708	528	708
Calcareous shale	708	848	708	848
Limy shale with coal	848	1,048	848	1,048
Sandy shale	1,048	1,208	1,048	1,208
Sandy shale with coal	1,208	1,348	1,208	1,348
sandstone	1,348	1,488	1,348	1,488
Sandy shale	1,488	1,568	1,488	1,568
Shaly sandstone	1,568	1,648	1,568	1,648
Silty shale	1,648	1,708	1,648	1,708
Sandy shale	1,708	1,808	1,708	1,808
Sandy shale/coal	1,808	2,025	1,808	2,028
Big Lime	2,057	2,175	2,060	2,177
Big Injun	2,175	2,608	2,177	2,610
Gantz Sand	2,608	2,937	2,610	2,942
Fifty Foot Sandstone	2,937	3,059	2,942	3,064
Gordon	3,059	3,321	3,064	3,329
Fifth Sandstone	3,321	3,460	3,329	3,469
Bayard	3,460	3,678	3,469	3,690
Warren	3,678	4,016	3,690	4,032
Speechley	4,016	4,487	4,032	4,511
Balltown	4,309	4,868	4,329	4,897
Bradford	4,487	4,868	4,511	4,897
Benson	4,868	5,294	4,897	5,332
Alexander	5,294	5,836	5,332	5,883
Rhinestreet	5,804	6,150	5,851	6,234
Sycamore	6,150	6,258	6,234	6,385
Middlesex	6,258	6,351	6,385	6,563
Burkett	6,351	6,373	6,563	6,623
Tully	6,373	6,383	6,623	6,651
Marcellus	6,383	NA	6,651	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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SW

LATITUDE 39°22'30" 4,854'

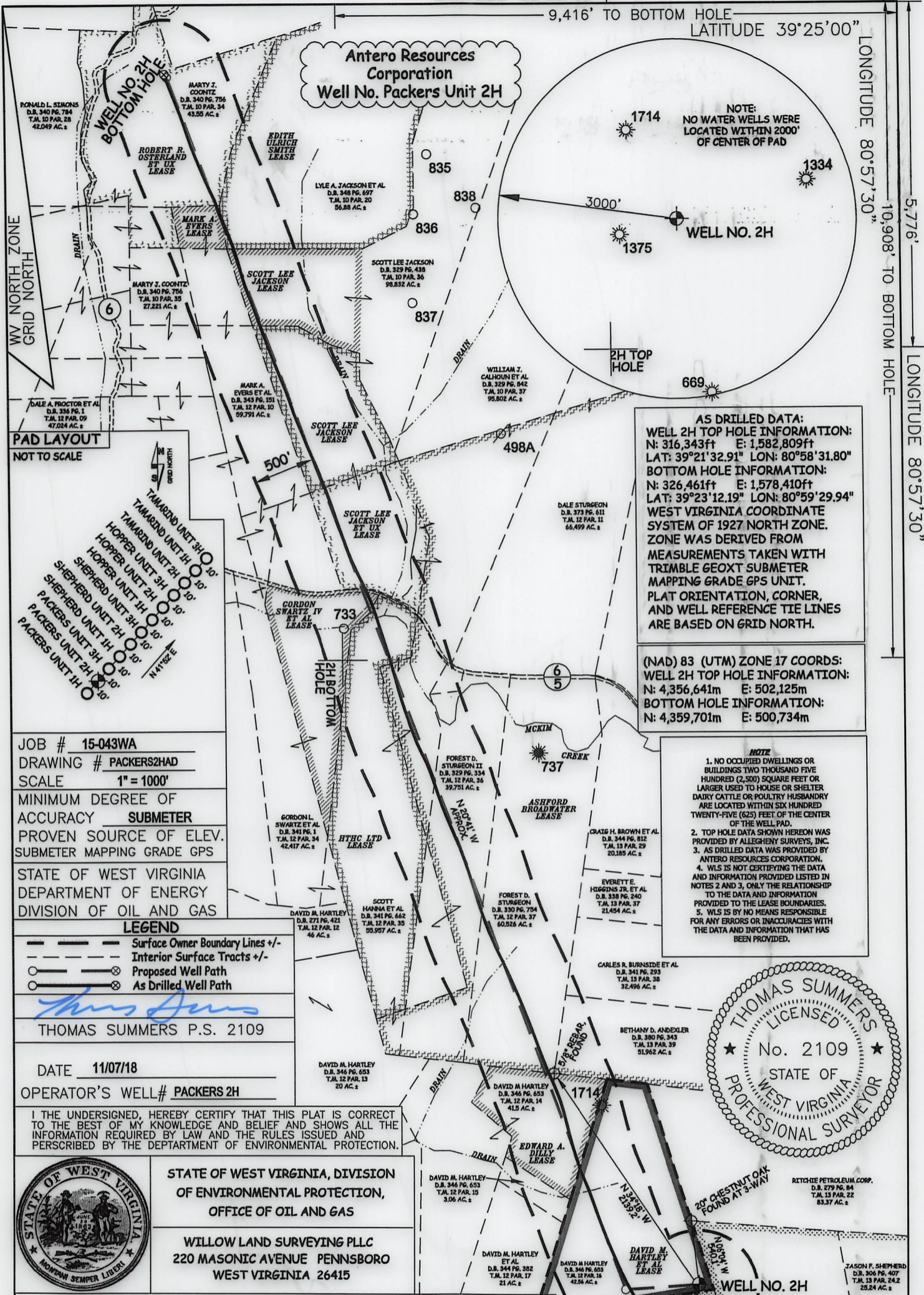
LATITUDE 39°25'00"

LONGITUDE 80°57'30"

10,908' TO BOTTOM HOLE

5,776' LONGITUDE 80°57'30"

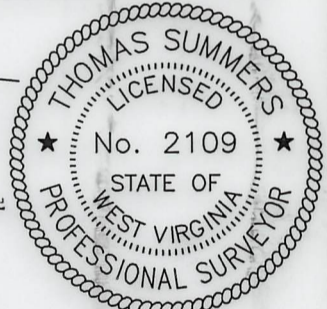
Antero Resources Corporation Well No. Packers Unit 2H



AS DRILLED DATA:
WELL 2H TOP HOLE INFORMATION:
 N: 316,343ft E: 1,582,809ft
 LAT: 39°21'32.91" LON: 80°58'31.80"
BOTTOM HOLE INFORMATION:
 N: 326,461ft E: 1,578,410ft
 LAT: 39°23'12.19" LON: 80°59'29.94"
 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: 4,356,641m E: 502,125m
BOTTOM HOLE INFORMATION:
 N: 4,359,701m E: 500,734m

- 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 ALLEGHENY SURVEYS, INC.
 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.



JOB # 15-043WA
 DRAWING # PACKERS2HAD
 SCALE 1" = 1000'
 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 11/07/18
 OPERATOR'S WELL# PACKERS 2H

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 AVENUE PENNSBORO WEST VIRGINIA 26415

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 LOCATION: ELEVATION 1,176' AS BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE PENNSBORO 7.5' SHL MIDDLEBOURNE 7.5 BHL
 DISTRICT MEADE COUNTY TYLER
 SURFACE OWNER DAVID M. HARTLEY ACREAGE 42.56 ACRES +/-
 OIL & GAS ROYALTY OWNER DAVID M. HARTLEY ET AL; TERRY L. SNIDER; EDWARD A. DILLY; ASHFORD BROADWATER; HTHC LTD; LEASE ACREAGE 42.56 AC±; 221.24 AC±; 72.38 AC±; 583.712 AC±; 7.70 AC±; 38.10 AC±; 23.60 AC±; 29.04 AC±; 22.90 AC±; 56.88 AC±; 4 AC±; 49.15 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 6,431' TVD 17,589' MD
 WELL OPERATOR ANTERO RESOURCES CORPORATION DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
 DENVER, CO 80202 CHARLESTON, WV 25313

LATITUDE 39°22'30"

4,854'

9,416' TO BOTTOM HOLE

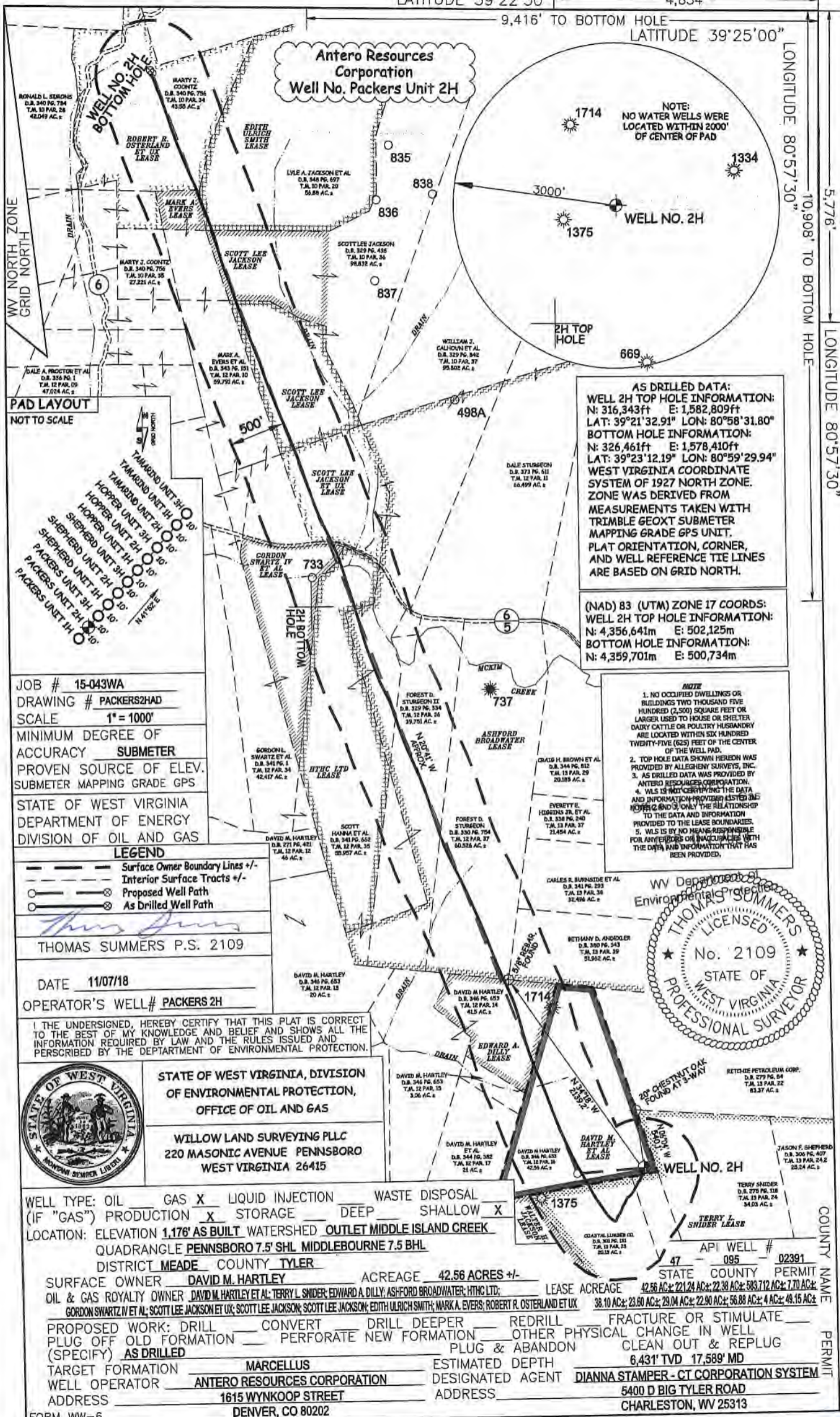
LATITUDE 39°25'00"

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PAD LAYOUT

NOT TO SCALE

- TAMARIND UNIT 3H 10'
- TAMARIND UNIT 2H 10'
- HOPPER UNIT 2H 10'
- HOPPER UNIT 1H 10'
- SHEPHERD UNIT 2H 10'
- SHEPHERD UNIT 1H 10'
- PACKERS UNIT 2H 10'
- PACKERS UNIT 1H 10'

JOB # 15-043WA
 DRAWING # PACKERS2HAD
 SCALE 1" = 1000'
 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 11/07/18
 OPERATOR'S WELL # PACKERS 2H

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 AVENUE PENNSBORO WEST VIRGINIA 26415

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 LOCATION: ELEVATION 1,176' AS BUILT WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE PENNSBORO 7.5' SHL MIDDLEBOURNE 7.5 BHL
 DISTRICT MEADE COUNTY TYLER

SURFACE OWNER DAVID M. HARTLEY ACREAGE 42.56 ACRES +/- LEASE ACREAGE 42.56 AC; 221.24 AC; 22.38 AC; 583.712 AC; 7.70 AC; 38.10 AC; 23.80 AC; 29.04 AC; 22.90 AC; 56.88 AC; 4 AC; 48.15 AC
 OIL & GAS ROYALTY OWNER DAVID M. HARTLEY ET AL; TERRY L. SNIDER; EDWARD A. DILLY; ASHFORD BROADWATER; HTHC LTD; GORDON SWARTZ IV ET AL; SCOTT LEE JACKSON ET UX; SCOTT LEE JACKSON; SCOTT LEE JACKSON; EDITH ULRICH SMITH; MARK A. EVERS; ROBERT R. OSTERLAND ET UX

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 6,431' TVD 17,589' MD
 WELL OPERATOR ANTERO RESOURCES CORPORATION DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD
 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/8/2018
Job End Date:	6/7/2018
State:	West Virginia
County:	Tyler
API Number:	47-095-02391-00-00
Operator Name:	Antero Resources Corporation
Well Name and Number:	Packers 2H
Latitude:	39.35914200
Longitude:	-80.97550000
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,471
Total Base Water Volume (gal):	22,152,443
Total Base Non Water Volume:	



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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
Fresh Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	88.94582	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.20273	

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SAND-COMMON WHITE - 100 MESH	Halliburton	Proppant					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
SAND- PREMIUM WHITE-30/50	Halliburton	Proppant					
				Listed Below			
MC B-8614	Halliburton	Biocide					
				Listed Below			
HYDROCHLORI C ACID	Halliburton	Solvent					
				Listed Below			
SAND- PREMIUM WHITE-40/70	Halliburton	Proppant					
				Listed Below			
FR-76	Halliburton	Friction Reducer					
				Listed Below			

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SP BREAKER	Halliburton	Breaker					
				Listed Below			
LP-70	Halliburton	Scale Inhibitor					
				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	10.81309	
			Hydrochloric acid	7647-01-0	15.00000	0.02308	
			Inorganic salt	Proprietary	30.00000	0.01650	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01650	
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.01650	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Guar gum	9000-30-0	100.00000	0.00882	
			Ethylene Glycol	107-21-1	60.00000	0.00856	
			Glutaraldehyde	111-30-8	30.00000	0.00265	
			Neutralized Polyacrylic Emulsion	Proprietary	10.00000	0.00143	
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00044	
			Sodium persulfate	7775-27-1	100.00000	0.00022	
			Ethanol	64-17-5	1.00000	0.00009	
			Methanol	67-56-1	60.00000	0.00008	
			Ethoxylated alcohols	Proprietary	30.00000	0.00003	
			Fatty acids, tall oil	Proprietary	30.00000	0.00003	

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			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1	30.00000	0.00003	
			Olefins	Proprietary	5.00000	0.00001	
			Propargyl alcohol	107-19-7	10.00000	0.00001	
			Phosphoric acid	7664-38-2	0.10000	0.00001	
			Sodium sulfate	7757-82-6	0.10000	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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