



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Thursday, April 9, 2020
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for PEGGY UNIT 2H
47-017-06899-00-00

Extend Lateral Length & Point of Entry. Extend Length 4346' to 12407'. Extend Measured Depth 14700' to 23800'. Updated Leases.

ANTERO RESOURCES CORPORATION

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

A handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned above the printed name and title.

James A. Martin
Chief

Operator's Well Number: PEGGY UNIT 2H
Farm Name: SAMUEL AND PEGGY SMITH
U.S. WELL NUMBER: 47-017-06899-00-00
Horizontal 6A New Drill
Date Modification Issued: 04/09/2020

Promoting a healthy environment.

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Corporation 494507062 017 - Dodd West Up Smithburg 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Peggy Unit 2H Well Pad Name: Peggy June Pad

3) Farm Name/Surface Owner: Samuel and Peggy Smith Public Road Access: Smithton Rd (Old US-50)

4) Elevation, current ground: 1275' Elevation, proposed post-construction: _____

5) Well Type (a) Gas Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow Deep _____

Horizontal _____

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 7400' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#

8) Proposed Total Vertical Depth: 7400' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 23800' MD ✓

11) Proposed Horizontal Leg Length: 12407' ✓

12) Approximate Fresh Water Strata Depths: 145', 215', 320'

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13) Method to Determine Fresh Water Depths: 17-04853, 17-05606, 17-01380

MAR 27 2010

14) Approximate Saltwater Depths: 1603'

WV Dept.
Environmental

15) Approximate Coal Seam Depths: 1601'

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	370 *see #19	370 *see #19	CTS, 514 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	23800	23800 ✓	6136 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

PERMIT MODIFICATION API # 47-017-06899

API NO. 47-017 - 06899

OPERATOR WELL NO. Peggy Unit 2H

Well Pad Name: Peggy June Pad

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Yield (cu. ft./k)
Conductor	30"	24"	0.438"	1530	50	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	1000	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12,630	2500	Landmark 2 & Tail-H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

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PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

WV Department of Environmental Protection

WW-6B
(10/14)

PERMIT MODIFICATION API # 47-017-06899

API NO. 47-017 - 06899

OPERATOR WELL NO. Peggy Unit 2H

Well Pad Name: Peggy June Pad

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

Anticipated Max Pressure - 9300 lbs

Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 40.52 Acres

22) Area to be disturbed for well pad only, less access road (acres): 8.89 Acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in Intermediate casing.

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24) Describe all cement additives associated with each cement type:

Conductor: no additives, Class A cement.

Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

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25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

Daniel A. Flack

Digitally signed by Daniel A. Flack
Date: 2020.03.24 13:07:05 -04'00'

UWI (APINum)	Well Name	Well Number	Operator	Hist Oper	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47017054000000	MOOSE GENE P & LINDA G	7192	CONSOL GAS COMPANY	DOMINION EXPL&PROD	5456	N/A	Maxton, Blue Monday, Warren, Riley, Alexander	Big Injun
47017045240000	MOORE	1	HARPER CROSBY HOLDNG	COBHAM GAS INDUSTRIE	5100	4204 - 4993	Riley, Benson, Alexander	Speechley

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MAR 24 2020

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LATITUDE 39°20'00"

10,749'

LATITUDE 39°17'30" 4,322' TO BOTTOM HOLE

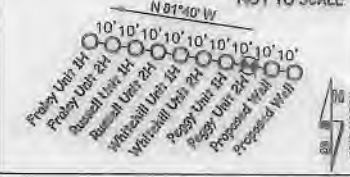
Antero Resources Corporation Well No. Peggy Unit 2H

NOTES:

WELL 2H TOP HOLE INFORMATION: N: 294,990ft E: 1,647,322ft LAT: 39°18'11.54" LON: 80°44'46.74" BOTTOM HOLE INFORMATION: N: 283,711ft E: 1,653,598ft LAT: 39°16'20.92" LON: 80°43'24.96" 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: 4,350,464m E: 521,888m BOTTOM HOLE INFORMATION: N: 4,347,060m E: 523,857m

PAD LAYOUT NOT TO SCALE



NO WATER WELL WERE LOCATED WITHIN 2000' OF CENTER OF PAD

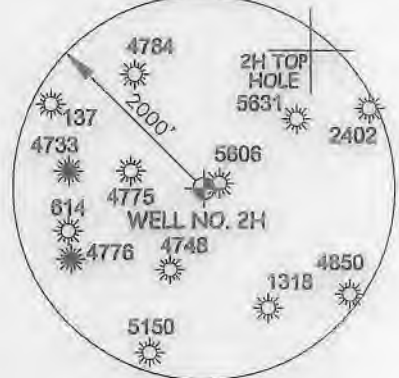


Table listing landowners and lease numbers in the West Union District - Doddridge County. Includes names like David Spenuale, Michael O'Brien, John Smith, George Wyckoff, and various lease numbers such as 08-49, 08-50, 09-52, etc.

6,990' TO BOTTOM HOLE

10,974'

LONGITUDE 80°42'30"

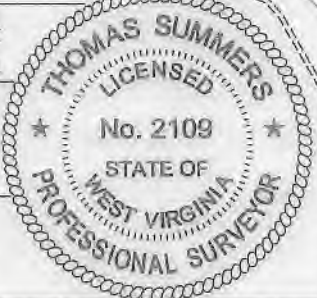
LONGITUDE 80°42'30"

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



- A = BRYAN E. HAGEDORN ET UX
B = WILLIAM M. SMITH
C = MARK A. OWENS
D = ALBIN HART ET UX
E = ALBIN HART ET UX
F = VIRGINIA LEE NICHOLSON
G = CASSANDRA DAWN EWING

JOB # 19-029WA
DRAWING # PEGGY2HMODR
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 +/-
Existing Fence
Found monument, as noted
THOMAS SUMMERS P.S. 2109
DATE 03/19/20
OPERATOR'S WELL# PEGGY UNIT #2H

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 14,272,434ft E: 1,712,179ft POINT OF ENTRY INFORMATION: N: 14,273,024ft E: 1,714,697ft BOTTOM HOLE INFORMATION: N: 14,261,265ft E: 1,718,640ft
REFERENCES
1" = 300'

Table listing landowners and lease numbers in the New Milton District - Doddridge County. Includes names like Elwood Hill, Patrick Price, Samuel Weakley, Roger Nicholson, and Donald Barnes.

NOTE
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.

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 017 06899 H40
(IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT
LOCATION: ELEVATION 1,275' - AS BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK
QUADRANGLE SMITHBURG 7.5 DISTRICT WEST UNION COUNTY DODDRIDGE
SURFACE OWNER SAMUEL AND PEGGY SMITH ACREAGE 28.956 ACRES +/-
OIL & GAS ROYALTY OWNER FLAINE DEBOLT; R. L. BARNES ET UX; V. B. CHAPMAN ET UX; R. L. BARNES ET UX; LEASE ACREAGE 04.8 AC +/- 222 AC +/- 155 AC +/- 15.66 AC +/-
JOAN M. STUTLER ET AL; E. C. JONES ET AL; SPENCER ENTERPRISES LLC; WVDH; WVSRA; WVDNR; CASSANDRA DAWN EWING; 100 AC +/- 300 AC +/- 9.91 AC +/- 36.5 AC +/- 301.19 AC +/- 777 AC +/- 2.78 AC +/-
NEIL JONES HARSHBARGER; SUSAN H. JONES; GEM HOLDINGS LLC; A.E. FITZWILLIAMS ET AL; KENNETH KOEBEL; ROBERT L. MOORE ET AL; 69 AC +/- 36 AC +/- 27.63 AC +/- 136.5 AC +/- 27.94 AC +/- 95.12 AC +/-
PROPOSED WORK: DRILL CONVERT DRILL DEEPER X REDRILL FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) MOD - BHL PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,400' TVD 23,800' 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

LATITUDE 39°20'00"

10,749'

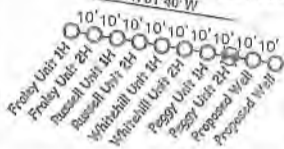
LATITUDE 39°17'30" 4,322' TO BOTTOM HOLE

Antero Resources Corporation Well No. Peggy Unit 2H

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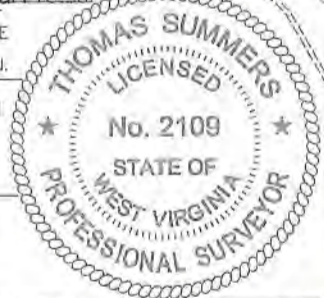
Department of Environmental Protection

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Table listing lease information for West Union District - Doddridge County, including well numbers and leaseholders.

Table listing lease information for New Milton District - Doddridge County, including well numbers and leaseholders.

JOB # 19-029WA DRAWING # PEGGY2HMODR SCALE 1" = 2000' MINIMUM DEGREE OF ACCURACY SUBMETER PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND: Surface Owner Boundary Lines +/- Interior Surface Tracts +/- Existing Fence Found monument, as noted

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DATE 03/19/20 OPERATOR'S WELL# PEGGY UNIT #2H



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SURFACE OWNER SAMUEL AND PEGGY SMITH ACREAGE 28,956 ACRES +/- OIL & GAS ROYALTY OWNER ELAINE DEBOLT; R. L. BARNES ET UX; V. B. CHAPMAN ET UX; R. L. BARNES ET UX; LEASE ACREAGE 84.8 AC.; 222 AC.; 156 AC.; 15.86 AC.; JOAN M. STUTLER ET AL.; E. C. JONES ET AL.; SPENCER ENTERPRISES LLC; WYDOH; WYNSA; WYDNR; CASSANDRA DAWN EWING; 100 AC.; 300 AC.; 9.91 AC.; 38.5 AC.; 301.19 AC.; 77 AC.; 2.29 AC.; NEIL JONES HARSHARGER; SUSAN H. JONES; GEM HOLDINGS LLC; A.E. FITZWILLIAMS ET AL.; KENNETH KOEHL; ROBERT L. MOORE ET AL. 89 AC.; 36 AC.; 27.03 AC.; 138.5 AC.; 27.94 AC.; 95.12 AC.

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FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

Operator's Well Number

Peggy Unit 2H

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Office of Oil and Gas

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

MAR 24 2020
WV Department of
Environmental Protection

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Elaine Debolt Lease</u>			
Elaine Debolt	Antero Resources Corporation	1/8+	433/306
<u>R.L. Barnes, et ux Lease (TM 12 PCL 8)</u>			
R.L. Barnes, et ux	South Penn Oil Company	1/8	19/71
South Penn Oil Company	Hope Natural Gas Company	Assignment	23/424
Hope Natural Gas Company	Consolidated Gas Supply Corporation	Assignment	143/345
Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	135/583
Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Name Change	332/563
CNG Transmission Corporation	Dominion Transmission Inc	Name Change	332/570
Dominion Transmission Inc	Consol Energy Holdings LLC XVI	Assignment	245/1
Consol Energy Holdings XVI	Conasol Gas Company	Merged	292/469
Consol Energy Gas Company	CNX Gas Company LLC	Merged	293/252
CNX Gas Company LLC	Antero Resources Corporation	Assignment	317/379
<u>V.B. Chapman, et ux Lease</u>			
V.B. Chapman, et ux	J. L. Mann	1/8	20/162
J. L. Mann	W.S. Hoskins, Trustee For Rock Run Oil and Gas Company	Assignment	24/3
W.S. Hoskins, Trustee for Rock Run Oil and Gas Company	Columbian Carbon Company	Assignment	27/470
Columbian Carbon Company	Columbian Fuel Corporation	Assignment	79/202
Columbian Fuel Corporation	Cities Service Oil Company	Merged	153/742
Cities Service Oil Company	Cities Service Company	Assignment	103/328
Cities Service Company	Cities Service Oil and Gas Corporation	Assignment	132/177
Cities Service Oil and Gas Corporation	OXY USA Inc	Name Change	205/614
OXY USA Inc	Ashland Exploration, Inc	Assignment	160/679
Ashland Exploration, Inc	Ashland Exploration Holdings, Inc	Name Change	WV SOS
Ashland Exploration Holdings, Inc	Blazer Energy Corp	Assignment	181/421
Blazer Energy Corp	Eastern States Oil & Gas Inc	Name Change	244/154
Eastern States Oil & Gas, Inc	Equitable Production Eastern States Inc	Name Change	WV SOS
Equitable Production Eastern States Inc	Equitable Production Company	Merged	WV SOS
Equitable Production Company	EQT Production Company	Name Change	281/346
EQT Production Company	Antero Resources Corporation	Assignment	325/539
<u>R.L. Barnes, et ux Lease (TM 12 PCL 9)</u>			
R.L. Barnes, et ux	South Penn Oil Company	1/8	19/71
South Penn Oil Company	Hope Natural Gas Company	Assignment	23/424
Hope Natural Gas Company	Consolidated Gas Supply Corporation	Assignment	143/345
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Consol Energy Gas Company	CNX Gas Company LLC	Merged	293/252
CNX Gas Company LLC	Antero Resources Corporation	Assignment	317/379

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

****CONTINUED ON NEXT PAGE****

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

MAR 24 2020

WV Department of
Environmental Protection

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
Joan M. Stutler et al Lease			
Joan M. Stutler et al	Hugh Spencer	1/8	0092/0489
Hugh Spencer	Estate of Hugh K. Spencer	Will	0033/0068
Estate of Hugh K. Spencer	Ronald B. Spencer Trust	Assignment	0251/0526
Ronald B. Spencer Trust	Spencer Enterprises LLC	Assignment	0251/0529
Spencer Enterprises LLC	Antero Resources Corporation	Assignment	0392/0271
E.C. Jones et al Lease			
E.C. Jones et al	N.S. Snyder	1/8	0018/0492
N.S. Snyder	Carnegie Natural Gas Company	Assignment	0092/0715
Carnegie Natural Gas Company	Carnegie Production Company	Assignment	0186/0061
Carnegie Production Company	EQT Production Company	Name Change	0129/0282
EQT Production Company	Antero Resources Corporation	Assignment	0325/0539
Dorothy E. O'Hanlon Lease			
Dorothy E. O'Hanlon	Antero Resources Corporation	1/8+	0412/0386
WVDOH Lease			
WVDOH	Antero Resources Corporation	1/8+	0473/0436
WV State Rail Authority Lease			
WV State Rail Authority	Antero Resources Appalachian Corporation	1/8	0253/0409
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	0046/0523
WVDNR Lease			
WVDNR	Antero Resources Corporation	1/8+	0483/0188
Cassandra D. Ewing Lease			
Cassandra D. Ewing	Antero Resources Corporation	1/8+	0431/0712
Neil Jones Harshbarger Lease			
Neil Jones Harshbarger	Eastern American Energy Corporation	1/8	0184/0681
Eastern American Energy Corporation	Energy Corporation of America	Conveyed	0240/0498
Energy Corporation of America	Antero Resources Corporation	Assignment	0328/0648
Susan Jones Lease			
Susan Jones	Antero Resources Corporation	1/8+	0354/0201
GEM Holdings LLC Lease			
GEM Holdings LLC	Antero Resources Corporation	1/8+	0455/0426

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

CONTINUED ON NEXT PAGE

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

MAR 24 2020

WV Department of
Environmental Protection

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>AE Fitzwilliams et al Lease</u>			
AE Fitzwilliams et al	The Carter Oil Company	1/8	0018/0055
The Carter Oil Company	Hope Natural Gas	Assignment	0026/0163
Hope Natural Gas	Consolidated Gas Supply Corporation	Assignment	0143/0345
Consolidated Gas Supply Corporation	CNG Transmission Corporation	Name Change	0332/0570
CNG Transmission Corporation	Dominion Transmission Inc.	Name Change	0332/0563
Dominion Transmission Inc.	Consol Energy Holdings	Assignment	0245/0001
Consol Energy Holdings LLC	CNX Gas Company LLC	Merger	0293/0252
CNX Gas Company LLC	Antero Resources Corporation	Assignment	0387/0216
<u>Kenneth Koebel Lease</u>			
Kenneth Koebel	Antero Resources Corporation	1/8+	0453/0001

WW-6A1
(5/13)

Operator's Well No. Peggy Unit 2H

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Office of Oil and Gas
MAR 24 2020
WV Department of
Environmental Protection

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
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Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Robert L. Moore et al</u>	Robert L. Moore et al	Jackson L. Smith Enterprises	1/8	0182/0286
	Jackson L. Smith Enterprises	Cobham Gas Industries Inc.	Assignment	0187/0572
	Cobham Gas Industries Inc.	Tri County Oil & Gas Inc.	Assignment	0192/0631
	Tri County Oil & Gas Inc.	Hayhurst Company	Assignment	0217/0042
	Hayhurst Company	Piney Holdings Inc.	Assignment	0253/0146
	Piney Holdings Inc.	Antero Resources Corporation	Assignment	0362/0589

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Antero Resources Corporation
 By: Tim Rady
 Its: VP of Land

FORM WV-6A1
EXHIBIT 1

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Office of Oil and Gas

MAR 24 2020

WV Department of
Environmental Protection

FILED

JUN 10 2013



IN THE OFFICE OF
SECRETARY OF STATE

Fenney Becker, Manager

Corporations Division

Tel: (304)558-8000

Fax: (304)558-8381

Website: www.wvscd.com

E-mail: business@wvscd.com

Office Hours: Monday - Friday

8:30 a.m. - 5:00 p.m. ET

APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY

FILE ONE ORIGINAL
(Two if you want a filed
stamped copy returned to you)
FEE: \$25.00

In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby applies for an Amended Certificate of Authority and submits the following statement:

- Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachia Corporation
- Date Certificate of Authority was issued in West Virginia: 6/25/2008
- Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
- Name the corporation elects to use in WV: Antero Resources Corporation
(due to home state name not being available)
- Other amendments: _____
(attach additional pages if necessary)
- Name and phone number of contact person. (This is optional; however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)
Allyn A. Schopp (304) 367-7310
Contact Name Phone Number
- Signature information (See below **Important Legal Notice Regarding Signatures**):
Print Name of Signer: Allyn A. Schopp Title/Capacity: Authorized Person
Signature: [Handwritten Signature] Date: June 10, 2013

Important Legal Notice Regarding Signatures For West Virginia Code §11D-1-12b. Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.



17-06896 MOD1
17-06899 MOD1
17-06900 MOD1
17-06901 MOD1

March 23, 2020

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Ms. Laura Adkins
601 57th Street
Charleston, WV 25304

Ms. Laura Adkins:

Antero Resources Corporation (Antero) would like to submit the following permit modification for an approved well on the existing Peggy June Pad: Russell Unit 1H (API # 47-017-06900), Russell Unit 2H (API # 47-017-06901), Peggy Unit 2H (API # 47-017-06899) & Fraley Unit 1H (API # 47-017-06896).

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the updated POE & Measured Depth
- REVISED Form WW-6A1, which shows the new leases we will be drilling into
- REVISED Mylar Plat, which shows the new Lateral Length & Estimated Measured Depth
- AOR & As-Built Design

If you have any questions please feel free to contact me at (303) 357-7223.

Thank you in advance for your consideration.

Sincerely,

Megan Griffith
Permitting Agent
Antero Resources Corporation

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WV Department of
Environmental Protection

Enclosures

WW-6B
(04/15)

API NO. 47- 017 - 06899
OPERATOR WELL NO. Peggy Unit 2H
Well Pad Name: Peggy June Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Corporation Operator ID: 494507062 County: Doddridge District: West Union Quadrangle: Smithburg 7.5'

2) Operator's Well Number: Peggy Unit 2H Well Pad Name: Peggy June Pad

3) Farm Name/Surface Owner: Samuel and Peggy Smith Public Road Access: Smithton Rd (Old US-50)

4) Elevation, current ground: 1275' Elevation, proposed post-construction:

5) Well Type (a) Gas X Oil Underground Storage Other (b) If Gas Shallow X Deep Horizontal X

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s): Marcellus Shale: 7400' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#



8) Proposed Total Vertical Depth: 7400' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 23800' MD

11) Proposed Horizontal Leg Length: 12407'

12) Approximate Fresh Water Strata Depths: 145', 215', 320'

13) Method to Determine Fresh Water Depths:

14) Approximate Saltwater Depths: 1603'

15) Approximate Coal Seam Depths: 1601'

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No X

(a) If Yes, provide Mine Info: Name: Depth: Seam: Owner:

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Environmental Protection

WW-6B
(04/15)

API NO. 47- 017 - 06899
OPERATOR WELL NO. Peggy Unit 2H
Well Pad Name: Peggy June Pad

18)

CASING AND TUBING PROGRAM

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20"	New	H-40	94#	80	80	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	370 *see #19	370 *see #19	CTS, 514 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	23800	23800	6136 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	30"	24"	0.438"	1530	50	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	1000	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12,630	2500	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

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MAR 24 2020
VOID
WV Department of Environmental Protection

WW-6B
(10/14)

API NO. 47- 017 - 06899
OPERATOR WELL NO. Peggy Unit 2H
Well Pad Name: Peggy June Pad

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.

*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

Anticipated Max Pressure - 9300 lbs
Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 40.52 Acres

22) Area to be disturbed for well pad only, less access road (acres): 8.89 Acres

23) Describe centralizer placement for each casing string:

Conductor: no centralizers
Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

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24) Describe all cement additives associated with each cement type:

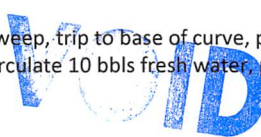
Conductor: no additives, Class A cement.
Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51
Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

MAR 24 2020

WV Department of
Environmental Protection

25) Proposed borehole conditioning procedures:

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.



*Note: Attach additional sheets as needed.

LATITUDE 39°20'00"

10,749'

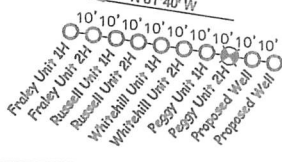
LATITUDE 39°17'30" 4,163' TO BOTTOM HOLE

Antero Resources Corporation Well No. Peggy Unit 2H

NOTES: WELL 2H TOP HOLE INFORMATION: N: 294,990ft E: 1,647,322ft LAT: 39°18'11.54" LON: 80°44'46.74" BOTTOM HOLE INFORMATION: N: 283,228ft E: 1,653,751ft LAT: 39°16'16.17" LON: 80°43'22.93" 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: 4,350,464m E: 521,888m BOTTOM HOLE INFORMATION: N: 4,346,914m E: 523,906m

PAD LAYOUT NOT TO SCALE



NO WATER WELL WERE LOCATED WITHIN 2000' OF CENTER OF PAD

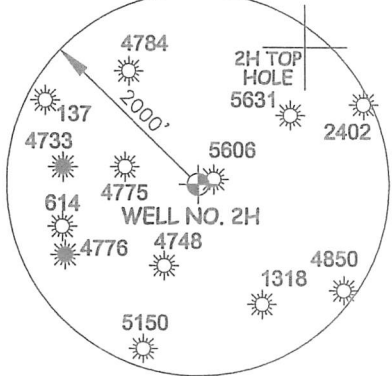


Table listing landowners and lease numbers for the West Union District - Doddridge County, including names like David Spanagle, Michael O'Brien, John Smith, etc.

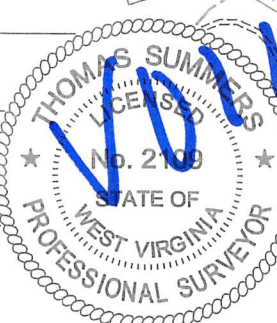
7,470' TO BOTTOM HOLE LONGITUDE 80°42'30" LONGITUDE 80°42'30"

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



- A = BRYAN E. HAGEDORN ET UX B = WILLIAM M. SMITH C = MARK A. OWENS D = ALBIN HART ET UX E = ALBIN HART ET UX F = VIRGINIA LEE NICHOLSON G = CASSANDRA DAWN EWING

JOB # 19-029WA DRAWING # PEGGY2HMOD 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 +/- Existing Fence Found monument, as noted THOMAS SUMMERS P.S. 2109 DATE 03/19/20 OPERATOR'S WELL# PEGGY UNIT #2H

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 14,272,434ft E: 1,712,179ft POINT OF ENTRY INFORMATION: N: 14,273,024ft E: 1,714,697ft BOTTOM HOLE INFORMATION: N: 14,260,785ft E: 1,718,801ft REFERENCES 1" = 300'

Table listing landowners and lease numbers for the New Milton District - Doddridge County, including names like Elwood Rill, Patrick Price, Samuel Weekley, etc.

NOTE: 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.

WELL TYPE: OIL GAS X LIQUID INJECTION WASTE DISPOSAL 47 017 06899 (IF "GAS") PRODUCTION X STORAGE DEEP SHALLOW X STATE COUNTY PERMIT LOCATION: ELEVATION 1,275' - AS BUILT WATERSHED HEADWATERS MIDDLE ISLAND CREEK QUADRANGLE SMITHBURG 7.5 DISTRICT WEST UNION COUNTY DODDRIDGE SURFACE OWNER SAMUEL AND PEGGY SMITH ACREAGE 28.956 ACRES +/- OIL & GAS ROYALTY OWNER ELAINE DEBOLT; R. L. BARNES ET UX; V. B. CHAPMAN ET UX; R. L. BARNES ET UX; LEASE ACREAGE 84.8 AC +/- 222 AC +/- 156 AC +/- 15.66 AC +/- JOAN M. STUTLER ET AL; E. C. JONES ET AL; SPENCER ENTERPRISES LLC; WVDON; WVSRA; WVDNR; CASSANDRA DAWN EWING; 100 AC +/- 300 AC +/- 9.91 AC +/- 38.5 AC +/- 301.19 AC +/- 777 AC +/- 2.29 AC +/- NEIL JONES HARSHBARGER; SUSAN H. JONES; GEM HOLDINGS LLC; A. E. FITZWILLIAMS ET AL; KENNETH KOEBLE; ROBERT L. MOORE ET AL 69 AC +/- 36 AC +/- 27.63 AC +/- 138.5 AC +/- 27.94 AC +/- 95.12 AC +/- PROPOSED WORK: DRILL CONVERT DRILL DEEPER X REDRILL FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) MOD - BHL PLUG & ABANDON CLEAN OUT & REPLUG TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,400' TVD 23,800' 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

LATITUDE 39°20'00"

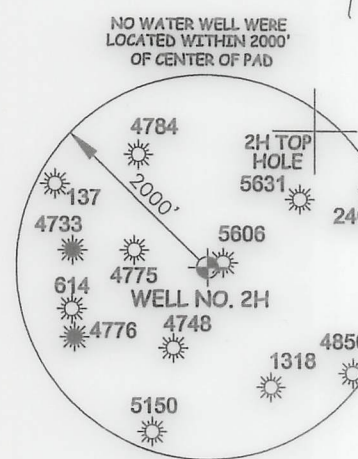
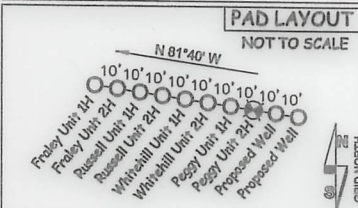
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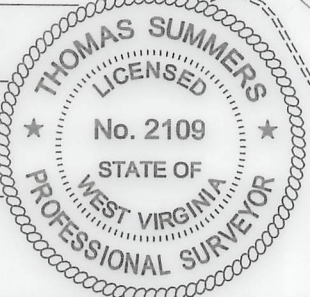
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STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS. WILLOW LAND SURVEYING PLLC, 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



- A = BRYAN E. HAGEDORN ET UX
B = WILLIAM M. SMITH
C = MARK A. OWENS
D = ALBIN HART ET UX
E = ALBIN HART ET UX
F = VIRGINIA LEE NICHOLSON
G = CASSANDRA DAWN EWING

Table listing well numbers and owners in the West Union District - Doddridge County. Includes wells 08-49 through 28-57.

Table listing well numbers and owners in the New Milton District - Doddridge County. Includes wells 01-03 through 01-10.

NOTE: 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.

JOB # 19-029WA
DRAWING # PEGGY2HMOD
SCALE 1" = 2000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

LEGEND: Surface Owner Boundary Lines +/-, Interior Surface Tracts +/-, Existing Fence, Found monument, as noted. THOMAS SUMMERS P.S. 2109, DATE 03/19/20, OPERATOR'S WELL# PEGGY UNIT #2H

(NAD) 27 (UTM) ZONE 17 COORDS: WELL 2H TOP HOLE INFORMATION: N: 14,272,434ft E: 1,712,179ft POINT OF ENTRY INFORMATION: N: 14,273,024ft E: 1,714,697ft BOTTOM HOLE INFORMATION: N: 14,260,785ft E: 1,718,801ft

Form containing well type (Oil/Gas), production (X), location (Elevation 1,275' - AS BUILT), surface owner (SAMUEL AND PEGGY SMITH), and proposed work (DRILL DEEPER X, REDRILL, etc.).

7,470' TO BOTTOM HOLE

LONGITUDE 80°42'30"

LONGITUDE 80°42'30"

COUNTY NAME

PERMIT