



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

Harold D. Ward, Cabinet Secretary
www.dep.wv.gov

Wednesday, September 29, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit Modification Approval for GLAMDRING UNIT 1H
47-095-02742-00-00

Lateral Extension, Updated Lease Chain

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.

James A. Martin
Chief

Operator's Well Number: GLAMDRING UNIT 1H
Farm Name: KAYLA LEEK
U.S. WELL NUMBER: 47-095-02742-00-00
Horizontal 6A New Drill
Date Modification Issued: 09/29/2021

Promoting a healthy environment.

10/01/2021

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

1) Well Operator: Antero Resources Corporation 494507062 095 - Tyler Ellsworth Porter Falls 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Glamdring Unit 1H Well Pad Name: Margery Pad

3) Farm Name/Surface Owner: Kayla Leek Public Road Access: CR 11

4) Elevation, current ground: 1041' 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

*DMH
9-16-21*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale: 7100' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2850#

8) Proposed Total Vertical Depth: 7100' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 24,100' MD

11) Proposed Horizontal Leg Length: 13,991'

12) Approximate Fresh Water Strata Depths: 103'

13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.

14) Approximate Saltwater Depths: 1998'

15) Approximate Coal Seam Depths: None Anticipated

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: _____

18) **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#	90	90	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	300	300	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500	2500	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	24100	24100	6234 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

*DAH
9-16-21*

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"	2730	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"	0.415"	12,630	9300	Lead-H/POZS 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			

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.

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

D14H
9-16-21

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 51.65 acres

22) Area to be disturbed for well pad only, less access road (acres): 13.44 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.

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

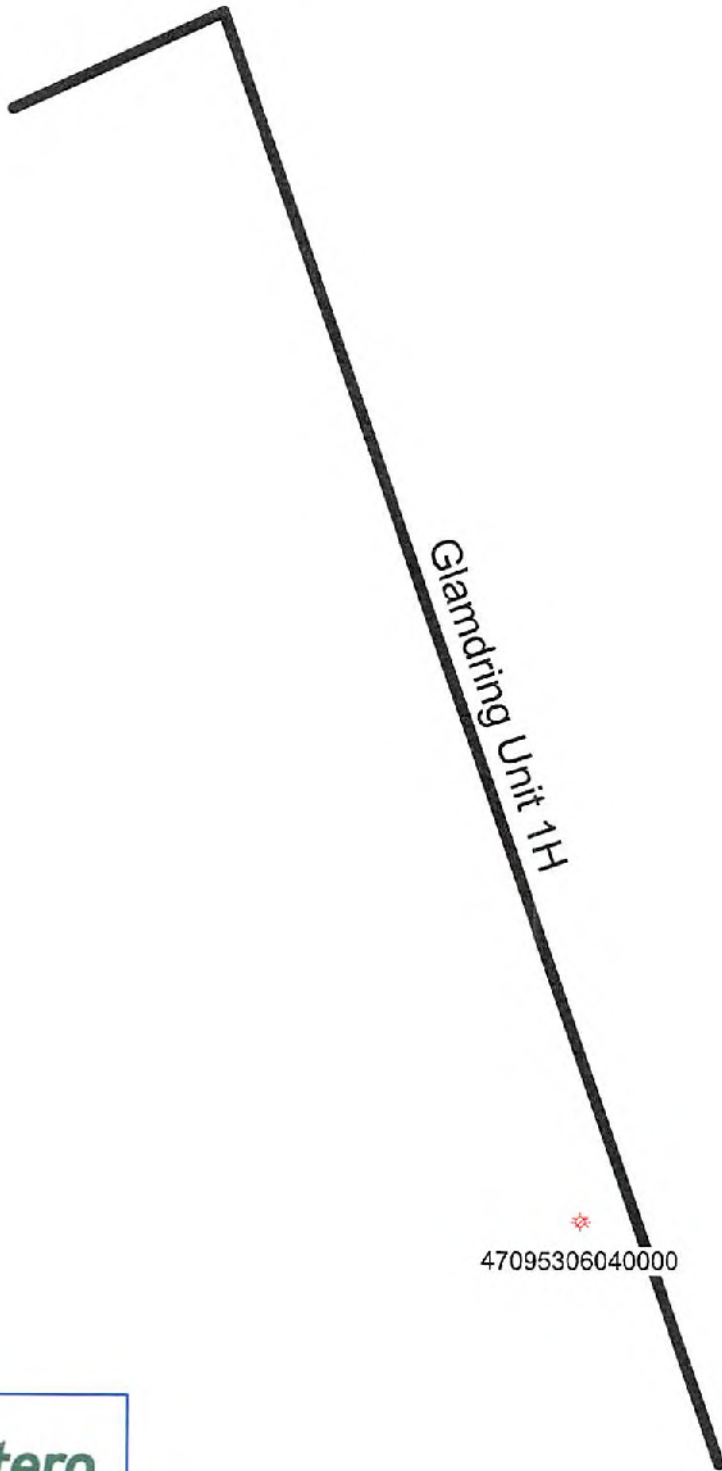
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

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

25) Proposed borehole conditioning procedures:

[Empty box for proposed borehole conditioning procedures]

*Note: Attach additional sheets as needed.



Glamdring Unit 1H

47095306040000



Antero Resources Corporation

Glamdring Unit 1H - AOR



WELL SYMBOLS
Plugged Gas Well

September 7, 2021

10/01/2021

LATITUDE 39°32'30"

10,543'

LATITUDE 39°32'30"

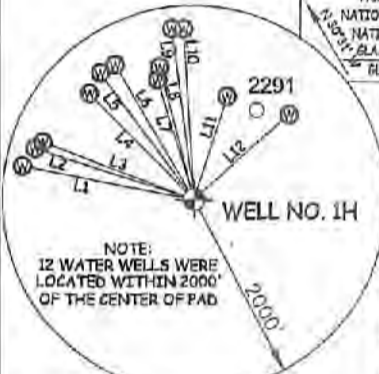
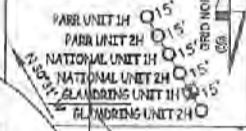
3,912' TO BOTTOM HOLE

Antero Resources Corporation Well No. Glamdring Unit 1H

NOTES:
WELL 1H TOP HOLE INFORMATION:
 N: 373,385ft E: 1,625,072ft
 LAT: 39°31'03.17" LON: 80°49'44.53"
BOTTOM HOLE INFORMATION:
 N: 360,622ft E: 1,631,520ft
 LAT: 39°28'57.97" LON: 80°48'19.89"
 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 1H TOP HOLE INFORMATION:
 N: 4,374,235m E: 514,710m
BOTTOM HOLE INFORMATION:
 N: 4,370,379m E: 516,740m

PAD LAYOUT NOT TO SCALE



NOTE:
12 WATER WELLS WERE LOCATED WITHIN 2000' OF THE CENTER OF PAD

WELL NO.	OWNER
22-16.3	Charles Stevens
22-17	Dorothy Stevens Revocable Trust
22-18	Clara Baker
22-18.1	Dorothy Stevens Revocable Trust
22-21	Paul Baker
22-22	Paul Baker
22-23	Anthony Parr
22-23.1	Raymond Parr
22-23.2	Anthony Parr
22-24	Ruth Weakley Est.
22-25	Paul Baker
22-26	John Sole
22-27	Carol Knapp Revocable Trust
22-28	WSD Properties LLC
22-29	WSD Properties LLC
22-30	WSD Properties LLC
22-31	Richard Gradsky Et Al
22-32	Richard Gradsky Et Al
22-33	Wilma Weakley
22-34	Raymond Parr Et Al
22-38	Bruce Parr
22-40	Ronald Webb

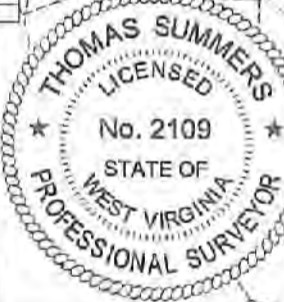
LINE	BEARING	DIST.	LINE	BEARING	DIST.
L1	N 79°23' W	1820.64'	L7	N 17°11' W	1289.39'
L2	N 72°38' W	1737.73'	L8	N 14°44' W	1409.38'
L3	N 69°39' W	1680.54'	L9	N 07°39' W	1774.92'
L4	N 49°05' W	1540.95'	L10	N 03°37' W	1761.12'
L5	N 36°53' W	1627.55'	L11	N 17°55' E	1113.35'
L6	N 30°40' W	1612.05'	L12	N 48°24' E	1322.09'

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 # 21-008WA
DRAWING # GLAMDRING1HR
SCALE 1" = 2000'
MINIMUM DEGREE OF ACCURACY SUBMETER
PROVEN SOURCE OF ELFV. SUBMETER MAPPING GRADE GPS

LEGEND
 — Surface Owner Boundary Lines +/-
 - - - Adjoining Surface Tracts +/-
 ⊕ Found monument, as noted

THOMAS SUMMERS P.S. 2109

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS

DATE 08/23/21
OPERATOR'S WELL# GLAMDRING UNIT #1H

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ API WELL # 47 - 095 - 02742
 (IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X STATE COUNTY PERMIT
 LOCATION: ELEVATION AS BUILT - 1,041' WATERSHED OUTLET MIDDLE ISLAND CREEK
 QUADRANGLE PORTER FALLS 7.5' DISTRICT ELLSWORTH COUNTY TYLER
 SURFACE OWNER KAYLA LEEK ACREAGE 69.06 ACRES +/-
 OIL & GAS ROYALTY OWNER RIDGETOP CAPITAL LP; RIDGETOP CAPITAL IV LP; LEASE ACREAGE 69.06 AC.±; 43.5 AC.±;
 RIDGETOP CAPITAL IV LP; DOUGLAS SCOTT FUNK, SR.; ANTERO RESOURCES CORP.; JOHN E. VALENTOUR ET UX; 16.5 AC.±; 10 AC.±; 40 AC.±; 80 AC.±;
 BRC APPALACHIAN MINERALS I LLC; S.A. SMITH & C.B. MORRIS HEIRS TRUST; BRC APPALACHIAN MINERALS I LLC; 55.13 AC.±; 304.5 AC.±; 10.10 AC.±;
 BOUNTY MINERALS LLC; BETTY MOREHEAD ET VIR; DAVID E. BOWYER; LAURA MAY; BRENDA CUIC; KAREN J. WOLF 82.25 AC.±; 68.88 AC.±; 75 AC.±; 48.37 AC.±; 114 AC.±; 28.28 AC.±

PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER X REDRILL ___ FRACTURE OR STIMULATE X
 PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE IN WELL
 (SPECIFY) MOD-BHL PLUG & ABANDON CLEAN OUT & REPLUG
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,100' TVD 24,100' 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

Ellsworth District - Tyler County	
11-51	Bear Knob Holdings LLC
16-0	David Leek
16-5.1	Richard Ferrall
16-6	Kayla Leek
16-7	John Thomas
16-7.1	Lianne Wilson
16-8	Juan Neal Et Al
16-9	Bear Knob Holdings LLC
16-10	Juan Neal Et Al
16-11	Juan Neal Et Al
16-15	Harvey Miller Et Al
16-16	Harvey Miller Et Al
16-16.1	Barbara Kirtle
16-17	Alfred Steele
16-18	Juan Neal Et Al
16-19	Juan Neal Et Al
16-20	Juan Neal Et Al
16-21	Kayla Leek
16-24	James Eastham
16-25	Nancy Fowler
16-26	Barbara Kirtle
16-27	Gilbert Eddy
16-28	Kenneth Tomblin Et Al
16-36	George Korbetta
16-37	Roseella Murner
16-38	EQT Production Company
16-39	Richard Pyles
16-39.1	Len Wilter
16-40	Gary Weakley
16-42	Richard Pyles
16-42.3	Richard Pyles
16-55	Ameria Energy Marcellus Minerals LLC
22-6	EQT Production Company
22-7	Kenneth Baker
22-8	EQT Production Company
22-9	Steven Wright
22-10	Leslie Henderson
22-13	Debra Blake
22-14	Leslie Weakley
22-15	Lannie Wade Et Al
22-16	Darlene Stephens
22-16.1	Juan McSwain
22-16.2	Samh Bassett

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.

6,276' TO BOTTOM HOLE
LONGITUDE 80°47'30"

8,785'
LONGITUDE 80°47'30"

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)

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>Ridgetop Capital LP Lease</u>			
Ridgetop Capital LP	Petroedge Energy LLC	1/8	0420/0643
Petroedge Energy LLC	Statoil USA Onshore Properties Inc.	Assignment	0436/0001
Statoil USA Onshore Properties Inc.	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Ridgetop Capital IV, LP Lease</u>			
Ridgetop Capital IV, LP	Antero Resources Corporation	1/8+	0620/0605
<u>Ridgetop Capital IV, LP Lease</u>			
Ridgetop Capital IV, LP	Antero Resources Corporation	1/8+	0632/0442
<u>Antero Resources Corporation Lease</u>			
Antero Resources Corporation	Antero Resources Corporation	1/8	0067/0760
<u>Douglas Frank Funk, Sr. Lease</u>			
Douglas Frank Funk, Sr.	Antero Resources Corporation	1/8+	0651/0792
<u>BRC Appalachian Minerals I, LLC Lease</u>			
BRC Appalachian Minerals I, LLC	BRC Working Interest Company, LLC	1/8+	0369/0300
BRC Working Interest Company, LLC	Chesapeake Appalachia, LLC	Assignment	0369/0784
Chesapeake Appalachia, LLC	Statoil USA Onshore Properties	Assignment	0378/0764
Statoil USA Onshore Properties, LLC	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>S. A Smith and C. Burke Morris Heirs Trust Lease</u>			
S. A Smith and C. Burke Morris Heirs Trust	Antero Resources Corporation	1/8+	0022/0268
<u>Bounty Minerals, LLC Lease</u>			
Bounty Minerals, LLC	Antero Resources Corporation	1/8+	0555/0337
<u>S. A Smith and C. Burke Morris Heirs Trust Lease</u>			
S. A Smith and C. Burke Morris Heirs Trust	Antero Resources Corporation	1/8+	0022/0268
<u>David E. Bowyer Lease</u>			
David E. Bowyer	Antero Resources Corporation	1/8+	0078/0318
<u>David E. Bowyer Lease</u>			
David E. Bowyer	Antero Resources Corporation	1/8+	0101/0738

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
<u>Betty Morehead et vir Lease</u>			
Betty Morehead et vir	Antero Resources Corporation	1/8+	0498/0111
<u>Laura May Lease</u>			
Laura May	Antero Resources Corporation	1/8+	0525/0103
<u>Brend Culc Lease</u>			
Brend Culc	JB Exploration I, LLC	1/8	0424/0431
JB Exporation I, LLC	Statoil USA Onshore Properties, LLC	Assignment	0509/0746
Statoil USA Onshore Properties, LLC	EQT Production Company	Assignment	0509/0746
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
<u>Karen Wolf Lease</u>			
Karen Wolf	Antero Resources Corporation	1/8+	0607/0129

WW-6A1
(3/13)

Operator's Well No. _____

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
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IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

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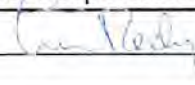
Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Karen Wolf	Karen Wolf	Antero Resources Corporation	1/8+	602/129

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



Stansberry, Wade A <wade.a.stansberry@wv.gov>

Expedited Modifications H6A Horizontal Well Work Permits Margery Pad

1 message

Stansberry, Wade A <wade.a.stansberry@wv.gov>

Wed, Sep 29, 2021 at 12:07 PM

To: Dani DeVito <ddevito@shalepro.com>, mhamsher@anteroresources.com, Derek Haught <derek.m.haught@wv.gov>, ljackson@wvassessor.com

I have attached permit copies for the Margery Pad for the following wells

- 95-02742
- 95-02743
- 95-02744
- 95-02745
- 95-02746

Thank you,

Wade A. Stansberry

Environmental Resource Specialist 3

West Virginia Department of Environmental Protection

Office of Oil & Gas

601 57th St. SE






Charleston, WV 25304

(304) 926-0499 ext. 41115

(304) 926-0452 fax

Wade.A.Stansberry@wv.gov

5 attachments

-  **47-095-02744 - mod.pdf**
631K
-  **47-095-02745 - mod.pdf**
634K
-  **47-095-02746 - Copy.pdf**
649K
-  **47-095-02743 - mod.pdf**
660K
-  **47-095-02742 - mod.pdf**
728K

10/01/2021