

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

Monday, October 3, 2022 PERMIT MODIFICATION APPROVAL Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION 1615 WYNKOOP STREET

DENVER, CO 80202

Permit Modification Approval for EMMONS UNIT 1H

47-095-02801-00-00

Lateral Extension

Re:

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.

Operator's Well Number: EMMONS UNIT 1H

Farm Name: ANTERO MIDSTREAM LLC

U.S. WELL NUMBER: 47-095-02801-00-00

Horizontal 6A New Drill

Date Modification Issued: 10/03/2022

Promoting a healthy environment.

CK# 4012936

Date: 8/30/22

Ant: #2500

API NO. 47- 095 ___ - 02801 OPERATOR WELL NO. Emmons Unit 1H MOD Well Pad Name: Beech Run Pad

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

1) Well Operator	: Antero Re	sources (Corporat	494507062	095-Tyler	Ellsworth Porter Falls 7.5'
,				Operator ID	County	District Quadrangle
2) Operator's We	ell Number: E	mmons L	Jnit 1H M	OD Well Pa	d Name: Beed	ch Run Pad
3) Farm Name/Si	urface Owner	Antero N	Midstream	LLC Public Ros	ad Access: Be	ech Run Rd.
4) Elevation, cur	rent ground:	1223'as	-built Ele	evation, proposed	post-construct	tion:
5) Well Type (a) Gas X		Oil	Und	erground Stora	nge
(Other					
(nallow	X	Deep		
		orizontal	<u>X</u>			
6) Existing Pad:						
, ,				pated Thickness ss- 55 feet, Associ	-	
8) Proposed Tota	ıl Vertical Dej	oth: 7500	D' TVD	/		
9) Formation at T	Γotal Vertical	Depth: N	Marcellus	/		
10) Proposed To	tal Measured	Depth: 2	21000' ME) ′		
11) Proposed Ho	rizontal Leg I	ength: 1	10606.6'	/		
12) Approximate	Fresh Water	Strata De _l	oths:	880'		
13) Method to D	etermine Fres	h Water D	epths: 4	7095308530000) /	
14) Approximate	Saltwater De	pths: 22	89'			
15) Approximate	Coal Seam D	epths: 43	31'			
16) Approximate	e Depth to Pos	sible Voic	d (coal min	ne, karst, other):	None Anticip	ated
17) Does Propos directly overlyin					N	o X
(a) If Yes, prov	ride Mine Info	: Name:				RECEIVED
		Depth:	:			Office of Oil and Gas
		Seam:				OCT 3 2022
		Owner	::			WV Department of Environmental Protection

Steve Myay Page 1 of 3 9-30-22

OPERATOR WELL NO. Emmons Unit 1H MOD

Well Pad Name: Beech Run Pad

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	<u>Grade</u>	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New	X-60	78.67#	100	100 *	CTS, 96 Cu. Ft.
Fresh Water	13-3/8"	New	J/K-55	54.5#	930	930	CTS, 969 Cu. Ft.
Coal	9-5/8"	New	J/K-55	36#	3000	3000	CTS, 1221 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110CY	20#	21000	21000 -	4364 Cu. Ft
Tubing	2-3/8"	New	N-80	4.7#			
Liners							

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"	0.375"	2250	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"	14,360	2500	Class G/H	~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

Kind:	N/A	RECEIVED
Sizes:	N/A	RECEIVED Office of Oil and Gas
Depths Set:	N/A	WV Department of
		Environmental Protection

Page 2 of 3

Stant Moy

9-30-22

OPERATOR WELL NO. Emmons Unit 1H MOD

Well Pad Name: Beech Run Pad

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

Drill a new horizontal shallow well into the 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): 24.47 acres
- 22) Area to be disturbed for well pad only, less access road (acres): 12.89 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.

RECEIVED
Office of Oil and Gas

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

OCT 3 2022

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.

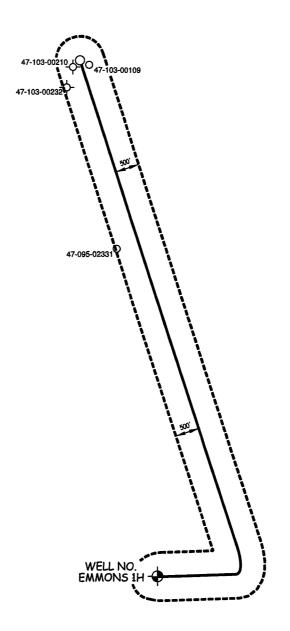
Page 3 of 3

Have May

9-30-22

4709502801

BEECH RUN PAD ANTERO RESOURCES CORPORATION



RECEIVED Office of Oil and Gas

OCT 0 3 2022

WV Department of Environmental Protection

•	SURVEYING, PLLC			SCALE : 1-IN	CH = 2000-FEE	Т
P.O. BOX 17, PENNS (304) 65		JOB #: 22-005WA	0'	2000'	4000'	6000'
DATE: 05/26/22	DRAWN BY: D.L.P.	FILE: EMMONS1HAOR.DWG				

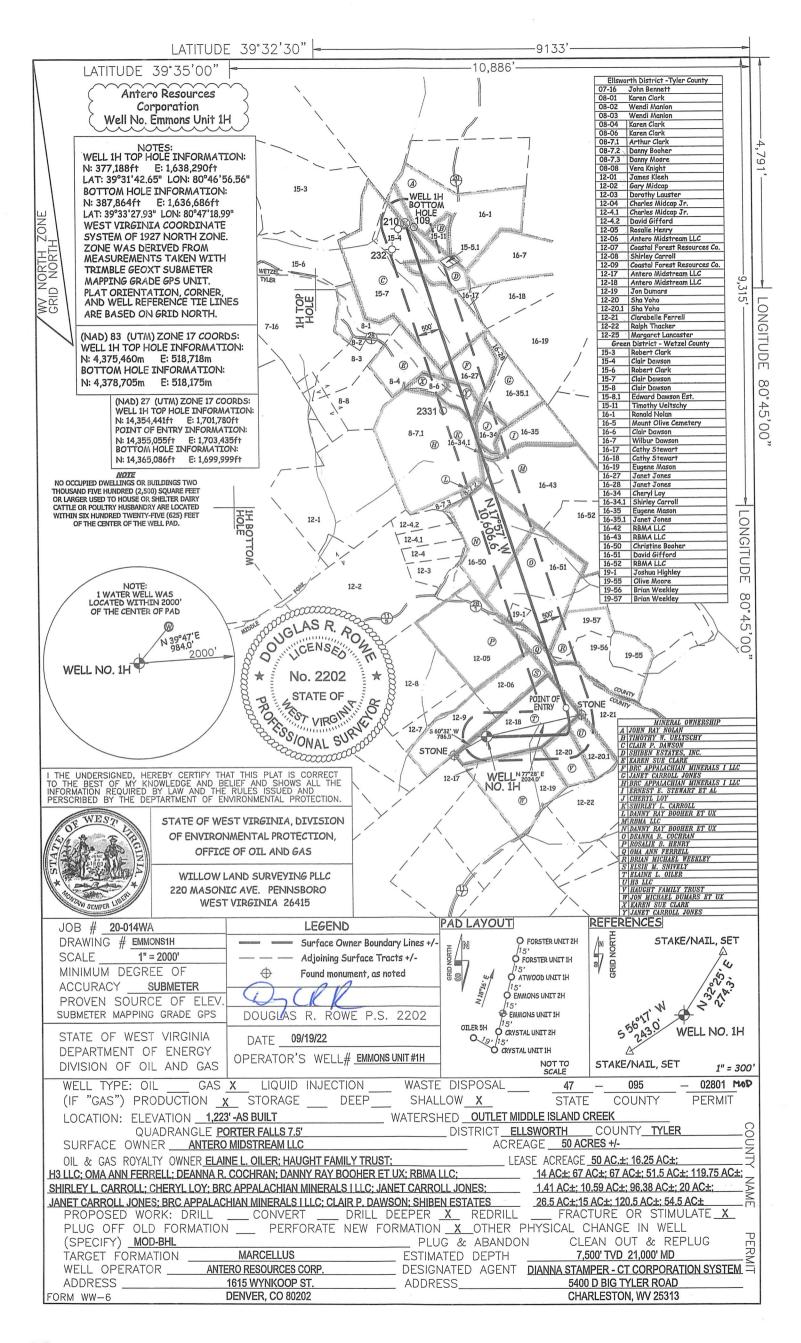
UWI (APINum)	Well Name	Well Number	Operator	Historical Operator	TD	Perforated Interval (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47095023310000	BIRCH YELLOW	1 V-1	ALLIANCE PETR CORP	ALLIANCE PETR CORP				
47103002320000	J W DAWSON	1	UNKNOWN	UNKNOWN	2,100			
47103002100000	HENRY ELSON	2	UNKNOWN	UNKNOWN	2,135			
47103001090000	HENRY ELSON	2	UNKNOWN	UNKNOWN	2,083			

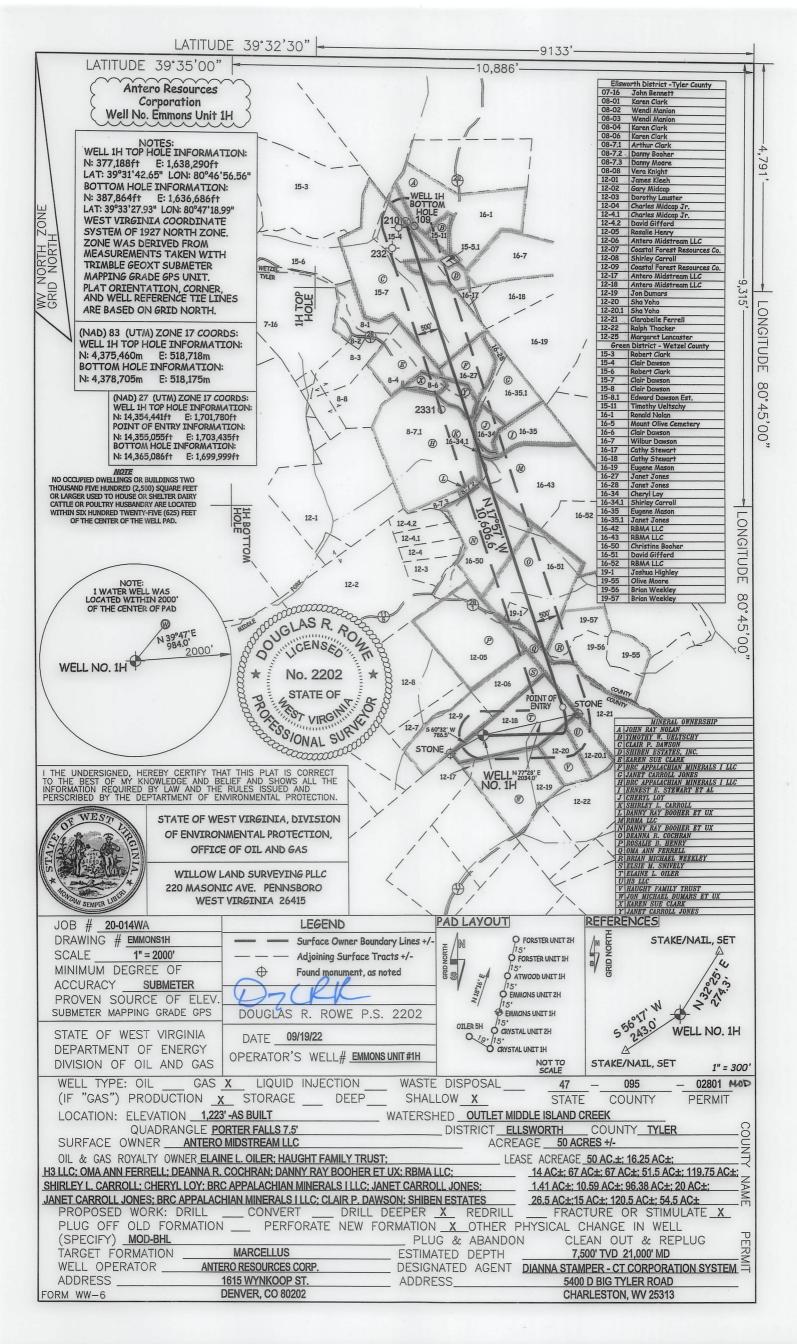
RECEIVED
Office of Oil and Gas

OCT 0 3 2022

WV Department of Environmental Protection

470950280





Operator's Well Number

Emmons Unit 1H MOD

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
T: Elaine L. Oiler Lease			
Elaine L. Oiler	Petroedge Energy LLC	1/8	0399/0725
Petroedge Energy LLC	Statoil USA Onshore Properties	Assignment	0406/0147
Statoil USA Onshore Properties	EQT Production Company	Assignment	0539/0239
EQT Production Company	Antero Resources Corporation	Assignment	0663/0001
V: Haught Family Trust Lease			
Haught Family Trust dated 4/17/1989	Montani Energy LLC	1/8+	0392/0069
Montani Energy LLC	Antero Resources Corporation	Assignment	0396/0759
U: H 3 LLC Lease			
H 3 LLC	Antero Resources Appalachian Corporation	1/8+	0417/0257
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	0557/0430
Q: Oma Ann Ferrell Lease			
Oma Ann Ferrell	Antero Resources Corporation	1/8+	0617/0754
R: Brian Michael Weekley Lease			
Brian Michael Weekley	Antero Resources Corporation	1/8+	283A/0609
O: Deanna R. Cochran Lease			
Deanna R. Cochran	Antero Resources Corporation	1/8+	270A/0789
N: Danny Ray Booher, et ux Lease		. 16	
Danny Ray Booher, et ux	Stone Energy Corporation	1/8	127A/0449
Stone Energy Corporation	EQT Production Company	Assignment	183A/0305
EQT Production Company	Antero Resources Corporation Office	RECEIVED Assignment e of Oil and Gas	0663/0001
M: RBMA, LLC Lease			
RBMA, LLC	Antero Resources Corporation	T 3 2022 1/8+	236A/0481
K: Shirley L, Carroll Lease	Em due	Department of mental Protection 1/2	
Shirley L. Carroll	Antero Resources Corporation	mental Protection 1/8	195A/0653
H: BRC Appalachian Minerals I, LLC Lease			
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 Inc	Assignment	0378/0764
Statoil USA Onshore Properties Inc	SWN Exchange Titleholder LLC	Assignment	0470/0668
SWN Exchange Titleholder LLC	SWN Production Company LLC	Merger	0009/0404
SWN Production Company, LLC	Antero Exchange Properties	Assignment	0544/0242
Antero Exchange Properties	Antero Resources Corporation	Merger	0525/0315
		8 61	

Operator's Well Number

Emmons Unit 1H MOD

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
J: Cheryl Loy Lease Cheryl Loy	Antero Resources Corporation	1/8+	187A/0916
Y: Janet Carroll Jones Lease Janet Carroll Jones	Antero Resources Corporation	1/8+	266A/277
F: BRC Appalachian Minerals I, LLC Lease			
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 Inc	Assignment	0378/0764
Statoil USA Onshore Properties Inc	SWN Exchange Titleholder LLC	Assignment	0470/0668
SWN Exchange Titleholder LLC	SWN Production Company LLC	Merger	0009/0404
SWN Production Company, LLC	Antero Exchange Properties	Assignment	0544/0242
Antero Exchange Properties	Antero Resources Corporation	Merger	0525/0315
C: Clair P. Dawson Lease Clair P. Dawson	Antero Resources Corporation	1/8+	179A/819

RECEIVED Office of Oil and Gas

OCT 3 2022

WV Department of Environmental Protection

*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. WW-6A1 (5/13)

Operator's Well No. Emmons Unit 1H MOD

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:

Lease Name or				- 15
Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
D: Shiben Estates Inc Lease				
	Shiben Estates Inc	Antero Resources Corporation	1/8+	265A/279
	tero Resources Corporation include 100 n the Marcellus and any other formation	0% rights to extract, produce and market ns completed with this well.	RECEIV Office of Oil a	
			OCT 3	2022
	Acknowledgemen	t of Possible Permitting/Approval	WV Departr	

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:

In Addition to the Office of Oil and Gas

- 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 Resoufces Corporation		
By:	Tim Rady (Lech		
Its:	Senior VP of Land		



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

Modification Horizontal H6A Well Work Permit (47-095-02800, 47-095-02801, 47-095-02802)

1 message

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

Tue, Oct 4, 2022 at 8:03 AM

To: Mallory Stanton <mstanton@anteroresources.com>, Diane Blair <dblair@anteroresources.com>, Dani DeVito <ddevito@shalepro.com>, ljackson@wvassessor.com, Stephen E McCoy <stephen.e.mccoy@wv.gov>, "Blevins, Cragin" <cragin.blevins@wv.gov>

I have attached a copy of the newly issued well permit number(s). This will serve as your copy.

47-095-02800 - CRYSTAL UNIT 2H 47-095-02801 - EMMONS UNIT 1H 47-095-02802 - EMMONS UNIT 2H

If you have any questions, then please contact us here at the Office of Oil and Gas.

Thank you,

Wade A. Stansberry

Environmental Resource Specialist 3

West Virginia Department of Environmental Protection

Office of Oil & Gas

601 57th St. SE

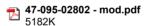
Charleston, WV 25304

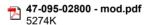
(304) 926-0499 ext. 41115

(304) 926-0452 fax

Wade.A.Stansberry@wv.gov

3 attachments





47-095-02801 - mod.pdf 5411K