

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 2H

47-095-02802-00-00

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 2H

Farm Name: ANTERO MIDSTREAM LLC

U.S. WELL NUMBER: 47-095-02802-00-00

Horizontal 6A New Drill

Date Modification Issued: 10/03/2022

Promoting a healthy environment.

API NO. 47-095	_ 02802	
OPERATOR	WELL NO.	Emmons Unit 2H MOD
Mall Pad N	lame: Beech	Run Pad

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

1) Well Operator: Antero Reso	urces Corporal	494507062	095-Tyler	Ellsworth	Porter Falls 7.5'
		Operator ID	County	District (Quadrangle
2) Operator's Well Number: Em	mons Unit 2H M	OD Well Pac	Name: Beec	h Run Pad	
3) Farm Name/Surface Owner:	Antero Midstream	LLC Public Roa	d Access: Bee	ech Run Rd.	
4) Elevation, current ground:	1223'as-built Ele	evation, proposed	post-construct	ion:	
5) Well Type (a) Gas X	Oil	Unde	erground Stora	ge	
Other					
(b)If Gas Shal	low X	Deep			
Hori	zontal X				
6) Existing Pad: Yes or No Yes					
7) Proposed Target Formation(s) Marcellus Shale: 7500' TVD, Ar		•			
8) Proposed Total Vertical Depth	7500' TVD				
9) Formation at Total Vertical De	epth: Marcellus				
10) Proposed Total Measured De	epth: 23600' MI) /			
11) Proposed Horizontal Leg Ler	ngth: 11894.3'	/			
12) Approximate Fresh Water St	rata Depths:	880'			
13) Method to Determine Fresh	Water Depths: $\underline{4}$	7095308530000			
14) Approximate Saltwater Dept	hs: 2289' /				
15) Approximate Coal Seam Dep	oths: 431'				
16) Approximate Depth to Possil	ole Void (coal mi	ne, karst, other):	None Anticipa	ated	
17) Does Proposed well location directly overlying or adjacent to		ns Yes	No	x <u>X</u>	
(a) If Yes, provide Mine Info:	Name:				
, , , , , , , , , , , , , , , , , , , ,	Depth:	RECE Office of C	IVED il and Gas		
	Seam:				
	Owner:		3 2022		
		WV Depa Environment			

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Steve Myoy
9-30-22

OPERATOR WELL NO. Emmons Unit 2H 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#	23600	23600	5019 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 Office of Oil and Gas
Sizes:	N/A	OCT 3 2022
Depths Set:	N/A	WV Department of Environmental Protection

Page 2 of 3
Steve May
9-30-22

OPERATOR WELL NO. Emmons Unit 2H 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.

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Environmental Protection

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:

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.

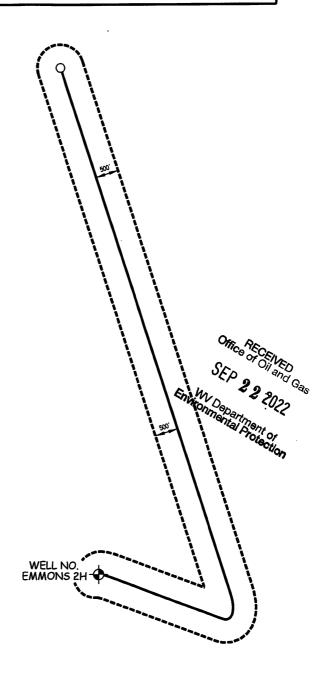
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

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

BEECH RUN PAD ANTERO RESOURCES CORPORATION



WILLOW LAND SURVEYING, PLLC P.O. BOX 17, PENNSBORO, WV 26415 (304) 659-1717

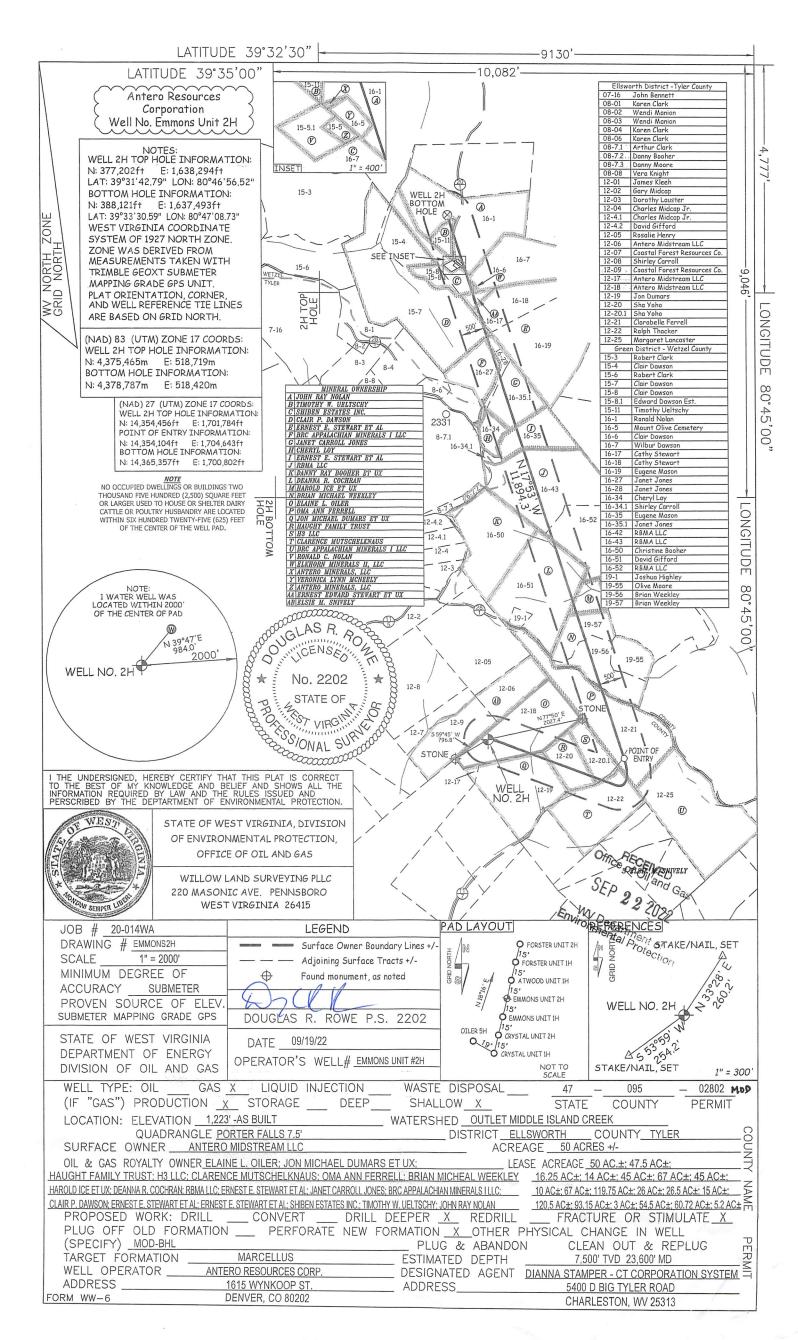
DATE: 05/26/22 DRAWN

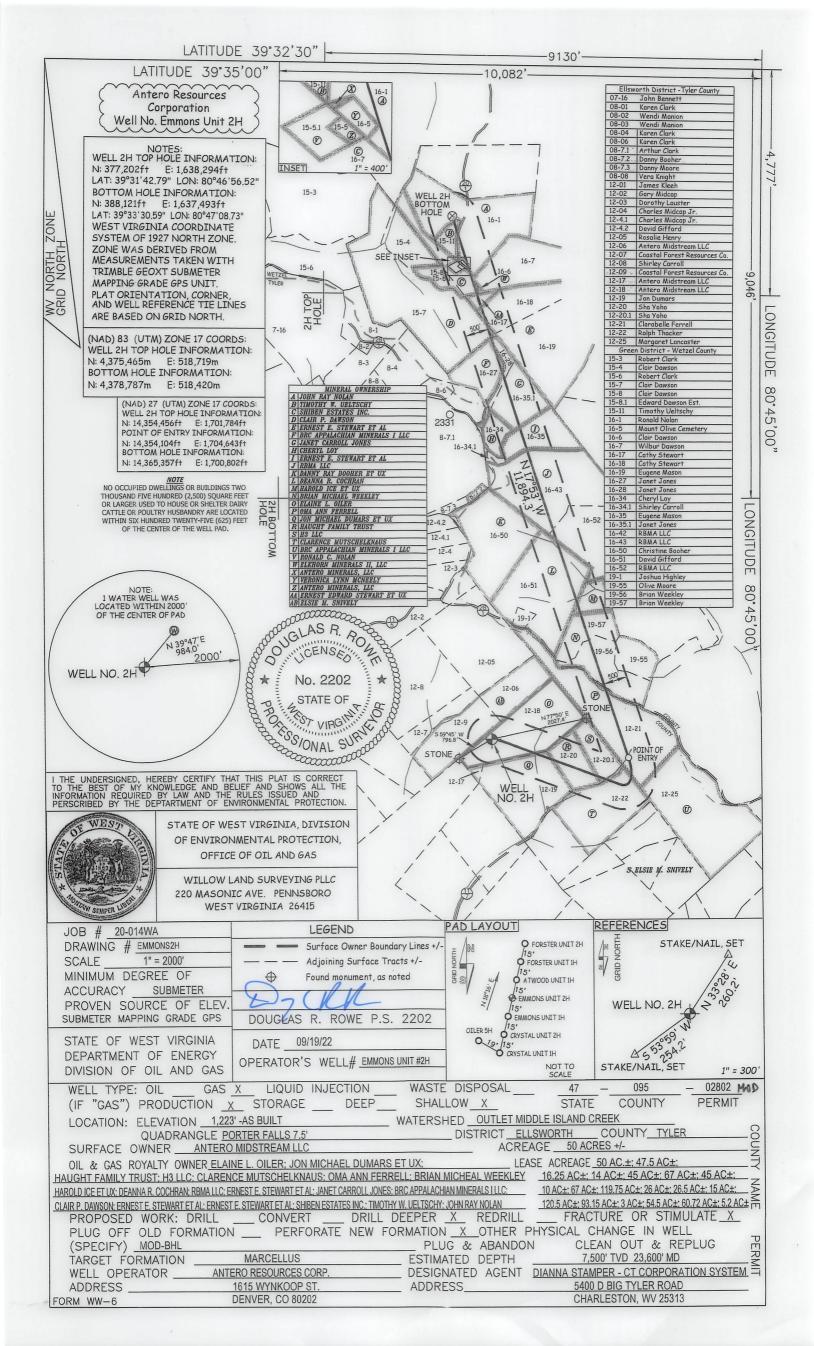
DRAWN BY: D.L.P.

JOB #: 22-005WA

FILE: EMMONS2HAOR.DWG

SCALE: 1-INCH = 2000-FEET 0' 2000' 4000' 6000'





Operator's Well Number

Emmons Unit 2H 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
✓ O: 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
Q; Jon Michael Dumars et ux Lease		16	207/7
Jon Michael Dumars et ux	Petroedge Energy LLC	1/8+	397/7 406/147
Petroedge Energy LLC	Statoil USA Onshore Properties Inc	Assignment	539/239
Statoil USA Onshore Properties Inc	EQT Production Company	Assignment Assignment	663/1
EQT Production Company	Antero Resources Corporation	Assignment	333, 2
R: Haught Family Trust Lease Haught Family Trust	Montani Energy LLC	1/8+	392/69
Montani Energy LLC	Antero Resources Corporation	Assignment	396/759
S: H3 LLC Lease	Antero Resources Appalachian Resource	es 1/8+	471/257
Antero Resources Appalachian Resources	Antero Resources Corporation	Name Change	557/430
T: Clarence Mutschelknaus Lease			
Clarence Mutschelknaus	Antero Resources Corporation	1/8+	156/242
P: OMA Ann Ferrell Lease		46	
OMA Ann Ferrell	Antero Resources Corporation	1/8+	617/754
N: Brian Michael Weekley Lease Brian Micharl Weekley	Antero Resources Corporation	1/8+	283A/609
Dildii Wichail Weekley	Antero Resources Corporation	2,0.	20374, 003
M: Harold Ice et ux Lease Harold Ice et ux	Antero Resources Corporation	1/8+	159A/544
	•	RECEIVED Office of Oil and Gas	
L: Denna R. Cochran Lease Denna R. Cochran	Antero Resources Corporation	1 /0+	270A/789
Demia R. Cocinan	Antero Resources Corporation	OCT 0 3 2022 1,50	LION, 103
J: RBMA LLC Lease	Antero Resources Corporation	MA/ Donorton and a 1/84	236A/481
RBMA LLC	Antero Resources Corporation	WV Department of 1/8+ Environmental Protection	230A) 481
I: Ernest E. Stewart et al Lease Ernest E. Stewart et al	Antero Resources Corporation	1/8+	238A/606
Linest L. Stewart et al	Antero Resources corporation	1,0+	2307,000
G: Janet Carroll Jones Lease	Antoro Posoureos Cornovation	1/8+	239A/200
Janet Carroll Jones	Antero Resources Corporation	1/0+	239A) 200
F: BRC Appalachian Minerals I LLC Lease BRC Appalachian Minerals I LLC	PDC Working Intert Co	4/0.	200/200
• •	BRC Working Interest Company LLC Chesapeake Appalachia LLC	1/8+	369/300 369/784
BRC Working Interest Company LLC Chesapeake Appalachia LLC	Statoil USA Onshore Properties Inc	Assignment Assignment	369/784 378/764
Statoil USA Onshore Properties Inc	SWN Exchange Titleholder LLC	Assignment	470/668
SWN Exchange Titleholder LLC	SWN Properties Company LLC	Merger	9/404
		0	2,

Operator's Well Number

Emmons Unit 2H MOD

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Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
SWN Production Company LLC Antero Exchange Properties	Antero Exchange Properties Antero Resources Corporation	Assignment Merger	544/242 525/315
D: Clair P. Dawson Lease Clair P. Dawson	Antero Resources Corporation	1/8+	179A/819
E: Ernest E. Stewart et al Lease Ernest E. Stewart et al	Antero Resources Corporation	1/8+	283/606
AA: Ernest Edward Stewart et ux Lease Ernest Edward Stewart et ux	Antero Resources Corporation	1/8+	286A/611
W: Elkhorn Minerals II, LLC Lease Elkhorn Minerals II, LLC	Antero Resources Corporation	1/8+	288A/443
C: Shiben Estates Inc Lease Shiben Estates Inc	Antero Resources Corporation	1/8+	265A/279
Y: Veronica Lynn McNeely Lease Veronica Lynn McNeely	Antero Resources Corporation	1/8+	2675/833
A: John Ray Nolan <u>Lease</u> John Ray Nolan	Antero Resources Corporation	1/8+	239A/439
B: Timothy W. Ueltschy Lease Timothy W. Ueltschy	Antero Resources Corporation	1/8+	228A/792

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WV Department of Environmental Protection WW-6A1 (5/13)

Oı	erator's	Well No.	Emmons Unit 2H MOD
- 1			

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)

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	John Ray Nolan	Antero Resources Corporation	1/8+	239A/439
John Ray Nolan Lease				
Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Lease Name or				

*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

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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 (ed)			
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

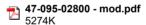
(304) 926-0499 ext. 41115

(304) 926-0452 fax

Wade.A.Stansberry@wv.gov

3 attachments

47-095-02802 - mod.pdf 5182K



47-095-02801 - mod.pdf 5411K