

west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

March 25, 2014

EQT PRODUCTION COMPANY POST OFFICE BOX 280 BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 9703814 , Well #: 511417 - HIGGINBOTHA Lateral Extended

Oil and Gas Operator:

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.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely

Gene Smith

Regulatory/Compliance Manager

Office of Oil and Gas



December 17, 2013

Mr. Gene Smith West Virginia Department of Environmental Protection Office of Oil and Gas 601 57th Street SE Charleston, WV 25304

Re: Modification of ADR125 (47-097-03814)

Dear Mr. Smith,

Attached is a modification to the casing program for the above well. EQT is extending the lateral section on this well. A new WW-6B, well schematics, WW-6A1 and Mylar plat is enclosed for your review.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

Vicki Roark

Permitting Supervisor-WV

Enc.

cc: Bill Hatfield P.O. Box 522

Buckhannon, WV 26201

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WV Department of Environmental Protection

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

MOD	M	0	D
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1) Well Operator: EQT Product	ion Company			097	2	203
Management Const. Authorization 9			Operator ID	County	District	Quadrangle
2) Operator's Well Number:		511417		_Well Pad Name	e	ADR125
3) Farm Name/Surface Owner : _	Mary I	F Higginboth	am et al	_Public Road Ac	cess:	Spruce Fork Road
4) Elevation, current ground:	1,572.0	Eleva	tion, proposed p	ost-construction:	1,57	2.0
5) Well Type: (a) Gas	Oil	Ur	derground Store	age		
Other						
(b) If Gas:	Shallow	•	Deep	×		
	Horizontal	•				
6) Existing Pad? Yes or No:	yes					
7) Proposed Target Formation(s),						
Target formation is Marcellus	at a depth of 763	6' with the antic	ipated thickness to I	be 101 feet and antici	pated target pr	ressure of 3376 PSI
8) Proposed Total Vertical Depth:				7636'		
9) Formation at Total Vertical Dep				Marcellus		
10) Proposed Total Measured De				15,852		
11) Proposed Horizontal Leg Leng	TO SECUL			7,070		
12) Approximate Fresh Water Stra	ata Depths:			105, 822, 85	8	
13) Method to Determine Fresh W	later Depth:			By offset we	lls	
14) Approximate Saltwater Depths				n/a		
15) Approximate Coal Seam Dept				, 521, 718, 835, 9	66	
16) Approximate Depth to Possibl	e Void (coal m	ine, karst, ot	her):		None re	eported
17)Does proposed well location adjacent to an active mine?	n contain coal s	seams direct	ly overlying or			-
(a) If Yes, provide Mine Info:	Name:					
No. of the state o						
	Owner:					

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CASING AND TUBING PROGRAM

18)							
TYPE	<u>Size</u>	<u>New</u> or Used	Grade	Weight per ft.	FOOTAGE: for Drilling	INTERVALS: Left in Well	CEMENT: Fill- up (Cu.Ft.)
Conductor Conductor	20	New	MC-50	81#	40	40	38
Fresh Water	13 3/8	New	MC-50	54#	958	958	833
Coal							
Intermediate	9 5/8	New	MC-50	40#	2,904	2,904	1,135
Production	5 1/2	New	P-110	20#	15,852	15,852	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TD

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20	24	0.375	(*)	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	1	1.21
Coal						
Intermediate	9 5/8	12 3/8	0.395	3,590	1	1.21
Production	5 1/2	8 1/2	0.361	12,640	-	1.27/1.86
Tubing				Y		
Liners						

Packers

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

Note 1: EQT plans to bring the TOC on the production casing cement job 1,000' above kick off point, which is at least 500' above the shallowest production zone, to avoid communication.

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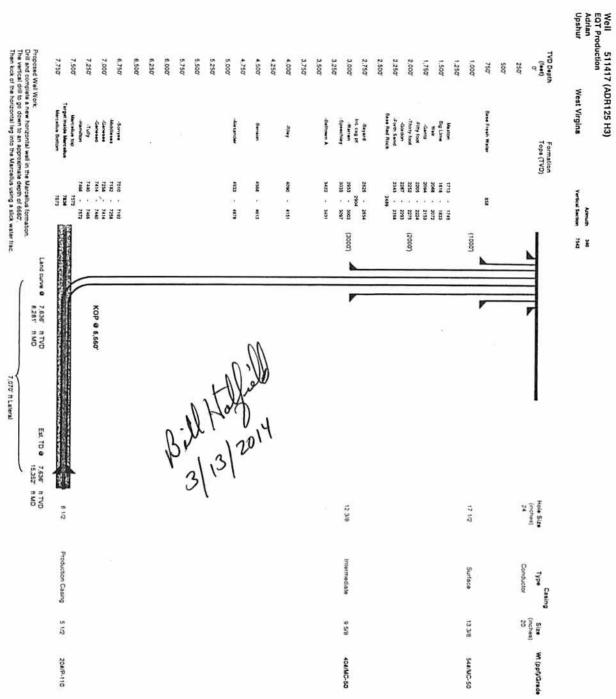
19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

(3/13)

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Drill and complete a new horizontal well in the Marcellus formation. The vertical drill to	to go down to an approximate depth of 6660',
then kick off the horizontal leg into the Marcellus formation using a slick water frac.	
20) Describe fracturing/stimulating methods in detail, including anticipate	
Hydraulic fracturing is completed in accordance with state regulations using water recycles freshwater sources. This water is mixed with sand and a small percentage (less than 0.39)	d from previously fractured wells and obtained from
gelling agent, gel breaker, friction reducer, biocide, and scale inhibitor), referred to in the in	ndustry as a "slickwater" completion. Maximum
anticipated treating pressures are expected to average approximately 8500 psi, maximum	n anticipated treating rates are expected to average
approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per	
21) Total area to be disturbed, including roads, stockpile area, pits, etc,	(acres): 16.6 ac
22) Area to be disturbed for well pad only, less access road (acres):	12.9 ac
23) Describe centralizer placement for each casing string.	
 Surface: Bow spring centralizers – One at the shoe and one spaced ex- Intermediate: Bow spring centralizers – One cent at the shoe and one statement 	very 500'.
Production: One spaced every 1000' from KOP to Int csg shoe	paced every 500.
24) Describe all cement additives associated with each cement type.	Surface (Type 1 Cement): 0-3% Calcium Chloride
Used to speed the setting of cement slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of the cer	ment slurry to a thief zone
Intermediate (Type 1 Cement): 0-3% Calcium Chloride. Salt is used in shallow, low	temperature formations to speed the setting of cement
slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss to a thief zone.	of whole drilling fluid or cement slurry (not filtrate)
Production:	
Lead (Type 1 Cement): 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening	time.
0.3% CFR (dispersant). Makes cement easier to mix.	
Tail (Type H Cement): 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening	g time.
0.2-0.3% CFR (dispersant). This is to make the cement easier to mix.	
60 % Calcuim Carbonate. Acid solubility.	
0.4-0.6% Halad (fluid loss). Reduces amount of water lost to formation.	
V.	
25) Proposed borehole conditioning procedures. Surface: Circulate hole cle	ean (Approximately 30-45 minutes) rotating & reciprocating
A CONTRACTOR OF THE CONTRACTOR	7077 NOV 17 Sec. 18 0 1992 NOVA -
one full joint until cuttings diminish at surface. When cuttings returning to surface	SS 1
minutes. To ensure that there is no fill, short trip two stands with no circulation.	
and circulate hole clean. A constant rate of higher than expected cuttings volum	Productive State (State
Intermediate: Circulate hole clean (Approximately 30-45 minutes) rotating & recipror	cating one full joint until cuttings diminish at
surface. When cuttings returning to surface diminish, continue to circulate an ad	ditional 5 minutes. If foam drilling, to enhance
hole cleaning use a soap sweep or increase injection rate & foam concentration.	RECEIVED
<u>Production:</u> Pump marker sweep with nut plug to determine actual hole washout. Ca	Office of Oil & Gas
Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean	
the shakers every 15 minutes.	DEC 1 9 2013
*Note: Attach additional sheets as needed.	WV Department of
	Environmental Protection
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03/28/2014

WV Departmental Protection

Environmental Protection

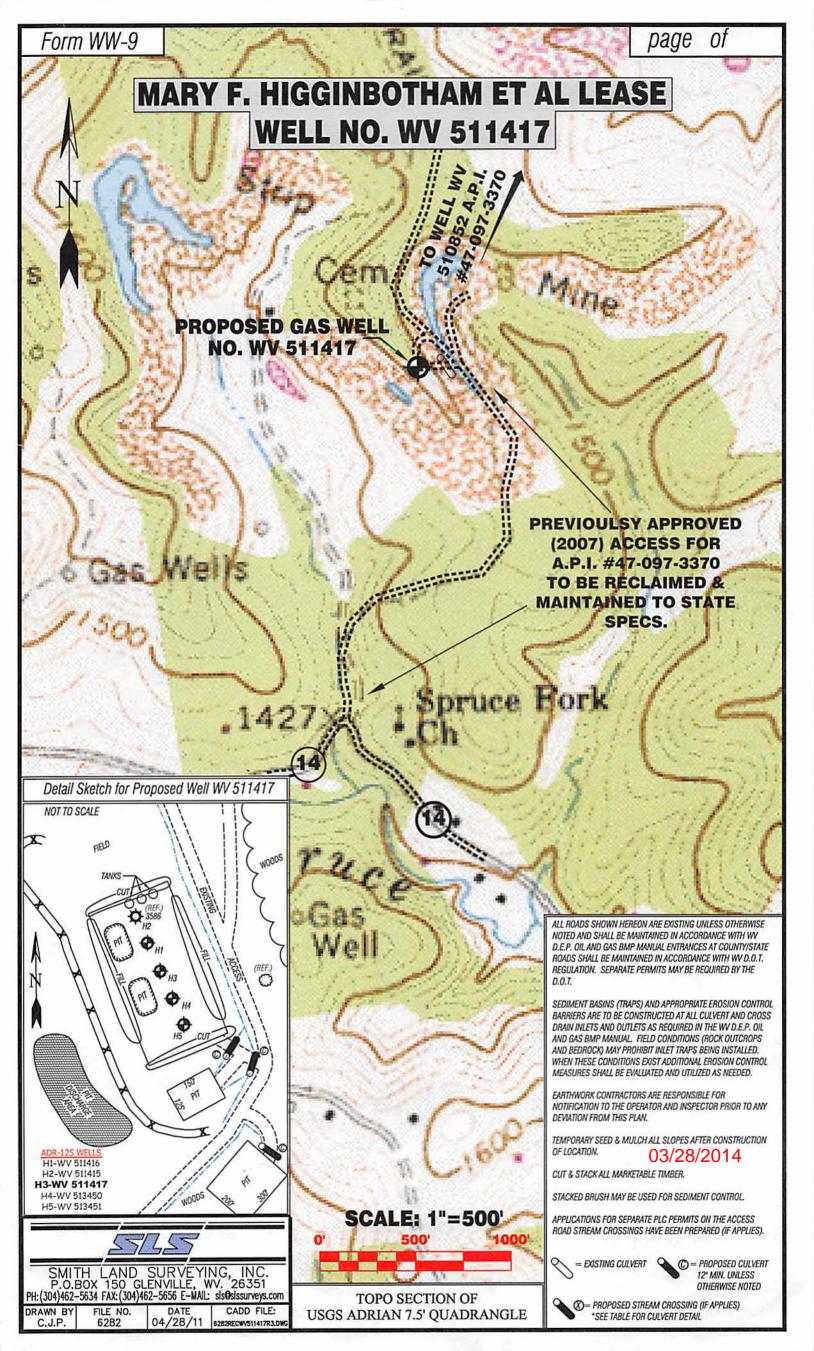
511417 (ADR125 H3)

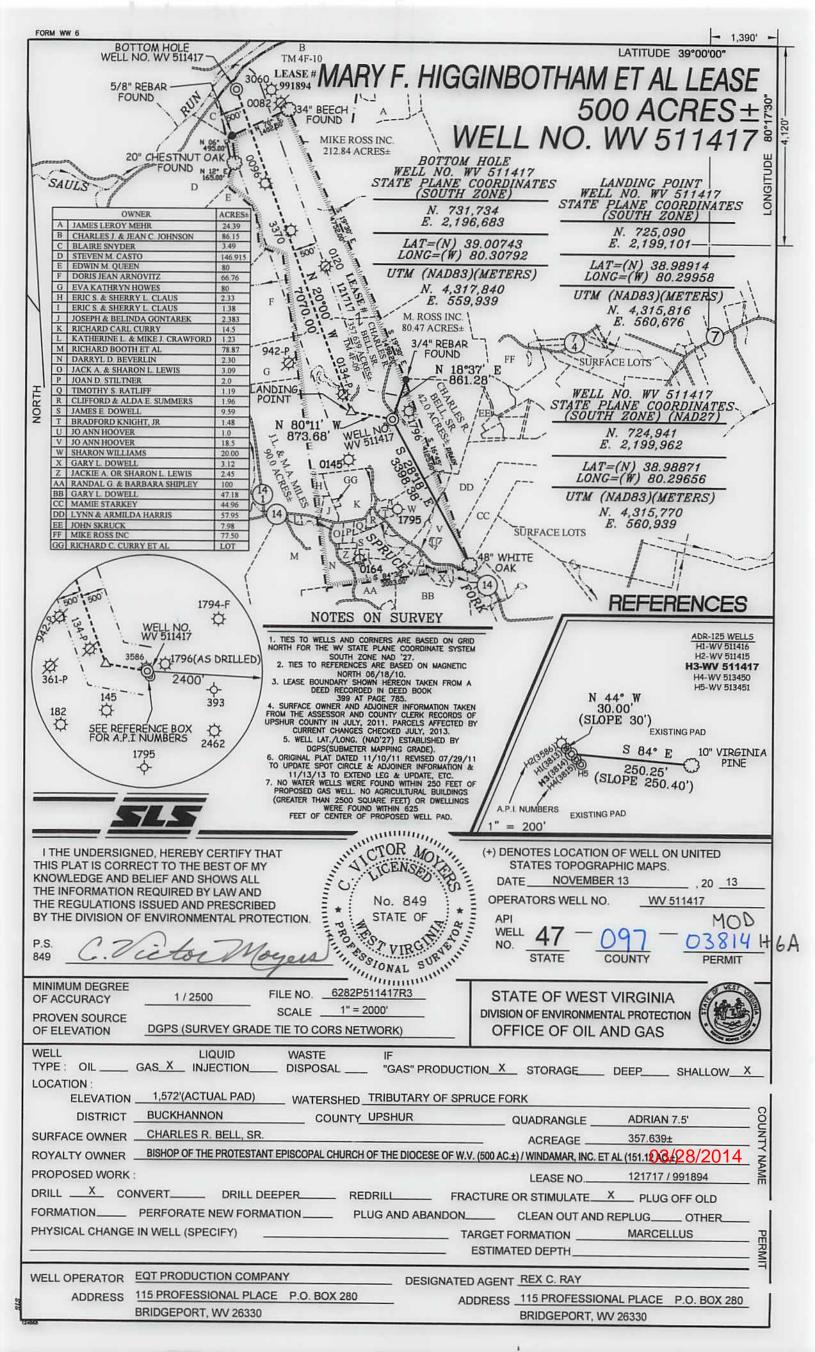
8,000' ---

1585 Marcellus Upshur West Virgina 0. — - 0' Hole Size 24" - 20" Conductor at 40' 7 Bit Size 17.5* 500' -**—** 500' TOC @ Surface 13 3/8", MC-50, 54.5# @ 858' Fresh Water Base 958" ft MD Bit Size 12.375* 1.000' -**--** 1,000' 1,500' — - 1.500 1,713' Maxton 1,816' Big Lime 2,066' Weir 2,000 - 2,094 - 2,000 2,205' 2,252' -Fifty foot -Thirty foot 2,287' 2,343' -Gordon -Forth Sand 2,500' — 2,489' Base Red Rock - 2.500 2,825' -Bayard 3,000' — 2,904' Int. csg pt TOC @ Surface Δ 2,904' ft MD 9 5/8°, MC-50, 40# @ **—** 3,000° 2,953' -Warren 3,035' -Speechley Bit Size 6.5* 3,500' — 3,422' -Bailtown A **—** 3,500° of the last 4,000' — 4,090' -Riley **- 4,000**° 4,500' — _{4,566'} -Benson **— 4,500**' 5,000' - 4,933' -Alexander **-** 5,000° 5,500' ----- 5.500 THE SECOND PROPERTY OF THE PRO 6,000 — -- 6.000 6.500' -**—** 6.500° 7,000' — 7,010' -Sonyea **--** 7,000' 7,192' -Middlesex 7,258' -Genesee KOP = 6,660' ft MD 7,414' -Geneseo 10 Deg DLS 7,440' -Tully 7,500' — 7,466' -Hamilton 8,281" ft MD **--** 7,500° 7,572' -Marcellus 7,673' Onondaga 5 1/2°, P-110, 200 15,352" ft MD

- 8,000

Elevation KB:





Operator's Well 1	No.
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1		
	14	
	14	



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:

1		2020	
1	6256	Name	or

, Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
121717			1/8 Min Pd	
	Mary F Higginbotham, et al	Pittsburgh & West Virginia Gas Company		LB 14X/403
	Pittsburgh & West Virginia Gas Company	Equitable Gas Company		DB 137/226
	Equitable Gas Company	Equitrans, Inc		DB 137/404
	Equitrans, Inc	Equitable Production- Eastern States, Inc.		Assign BK 44/7
	Equitable Production- Eastern States, Inc.	Equitable Production Company		CB 13/14 Wetzel
/	Equitable Production Company	EQT Production Company		CB 13/14 Wetzel
991894	M & R Investments, Inc.	EQT Production Company		Assign Bk 54/386

Upon information and belief, Operator's lease and/or other real property rights permit it to conduct drilling operations for the subject well in the location shown on the plat, including under any public roads that the well lateral crosses.

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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WV Department of

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The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaced to the 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:	EQT Production Company
By:	With M
Its:	Permitting Supervisor

03/28/2014