

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 Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

PERMIT MODIFICATION APPROVAL Horizontal 6A / Horizontal 6A Well - 1

MOUNTAINEER KEYSTONE, LLC 6031 WALLACE RD EXT, STE 300

WEXFORD, PA 15090

Re: Permit Modification Approval for 213

47-033-05871-00-00

Extend Lateral

MOUNTAINEER KEYSTONE, LLC

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.

James A. Martin

Chief

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

Operator's Well Number: 213 Farm Name: LYNCH FARM, LLC

U.S. WELL NUMBER: 47-033-05871-00-00 Horizontal 6A / Horizontal 6A Well - 1

Date Issued: 12/5/2016

Promoting a healthy environment.

API NO. 47	<u> 33 -</u>	05871	
OPERATO			_
Well Pad	Name:	Tony's Bridge	_

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

1) Well Operat	or: Mount	aineer Ke	ystone, L	LC 494501227		arrison	Grant	Mount Clare
				Operator II) C	ounty	District	Quadrangle
2) Operator's V	Well Numbe	r: <u>213 </u>	_	We	ll Pad Na	ame: Tony	's Bridge	•
3) Farm Name	Surface Ow	ner: Lyn	ch Farms	, LLC Public	Road A	Access: Col	unty Rou	te 25
4) Elevation, c	urrent groun	id: 113	39.6	Elevation, prop	osed pos	st-constructi	on: 1140	.5
5) Well Type	(a) Gas	X	Oil		Undergr	ound Storag	ge	
	Other							
	(b)If Gas	Shallow	<u> </u>	Dee	p			
		Horizon	ital X					
6) Existing Pac	i: Yes or No	yes						
				ticipated Thicki 7' (TVD Toe);			ressure(s):	
8) Proposed To	otal Vertical	Depth:	7197'					
9) Formation a	t Total Vert	ical Depth	: Marce	ellus Shale	.=			
10) Proposed 7	Total Measu	red Depth	15,14	4'			- Mos	
11) Proposed H	Horizontal L	eg Length	: <u>7439'</u>					
12) Approxima	ate Fresh Wa	ater Strata	Depths:	250'				
13) Method to	Determine l	Fresh Wat	er Depths:	Offsetting wells reported	water depths (0	33-04454, 033-04455	i; 033-04558, 033-0-	4692, 033-04775)
14) Approxima	ate Saltwate	r Depths:	2300'					
15) Approxima	ate Coal Sea	m Depths	: <u>Pittsbu</u>	ırgh - 37.5'		·		
16) Approxima	ate Depth to	Possible	Void (coal	mine, karst, oth	er): no	ne known	<u> </u>	
17) Does Propedirectly overly						No	X	
(a) If Yes, pro	ovide Mine	Info: Na	ame:					
		De	epth:				- ou had	EIVED Oil and Gas
		Se	am:				用EU	Oil and Gas
		O	wner:				Office or	- 1 2016
							DEC	Or Tain

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Environmental Protection
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12/09/2016

WW-6B
(04/15)

API NO. 47
OPERATOR WELL NO. 213
Woll Dad Namo: Tony's Bridge

18)

CASING AND TUBING PROGRAM

ТҮРЕ	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	24"	New	H-40	94#	80'	80'	Grout
Fresh Water	13.375"	New	J-55	54.5#	350'	350'	CTS
Coal							
Intermediate	9.625"	New	J-55	40#	2400'	2400'	CTS
Production	5.5"	New	P-110	20#	15,144'	15,144'	CTS
Tubing			,				
Liners			_				

ТҮРЕ	Size (in)	Wellbore Diameter (in)	<u>Wall</u> <u>Thickness</u> <u>(in)</u>	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	24"	36"			0	None	None
Fresh Water	13.375"	17.5"	0.38"	2730psi	0	Class A, 3% CaC12	1.20
Coal							
Intermediate	9.625"	12.25"	0.395"	3950 psi	0	Class A, 2% CaC12	1.29
Production	5.5"	8.5-8.75	0.361"	12640psi	9500	Type 1	1.64/1.32
Tubing					5000		
Liners					N/A		

Pan

PACKERS

Kind:			
Sizes:			
Depths Set:		RECEI ¹ Office of Oil	/ED and Gas
	<u> </u>	 Office or on	

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WV Department of Environmental Protection

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Mountaine Keystone	eer 🔽		Mountaineer Keys Tony's Bridge 2 Casing Design Directional Plan #	213 In
Other Names:	N/A		Directional Fiant #	County: Harrison
Surface Location: Bottom Hole Location:	TBD TBD			State: West Virginia
Total Depth:	15,144 MD (ft) 7,197 TVD (ft)			RKB: 21
Logs	Significant	Depth (ft)	Depth (ft)	Hole Casing and Mud Directional & Surveys
	Formations (TVD)	MD	TVD	Size Cement Drlg /Csg Point
None	Section 1		Drive Pipe	
		80	80	24" 94# H-40 STC Vertical
None				17 1/2" (PDC) Floc Water
	Section 2		Floc	Cement:Type 1 489 Sacks w/ 30% Excess TOC: Surface (top off if needed) All cement volumes are estimates
Possible				
CBL after cement job		350	☐ 350 ☐ ☐	13 3/8" 54.5# J-55 STC Vertical
None	Section 3		Floc	12 1/4" (PDC) Floc Water Cement:Type 1 678 Sacks w/ 50% Excess TOC: Surface (top off if needed) All cement volumes are estimates
Possible				
CBL after cement job		2,400	2,400	9 5/8" 40# J-55 LTC Vertical
	Section 4		Floc	Mud Data From To Floc Water 80 2400 Floc Water 2400 0.815 11.5- 12.0 ppg SOBM 6.815 15.144 Bit Data From To 17-1/2" 8.12 1/4" PDC 80 2.400 8- 3/4" (PDC) 1.400 7.815 8- 1/2" (PDC) 1.815 15.144 Directional Data See Directional Plan
			ОВМ	
	Big Lime		1,523	
	1st Elk Siltstone		5,065	Mod
	Tully Lime		6,921	
	Purcell (Limestone)		7,172	
	Lower Marcellus		7,175	Cement: Type 1 1.2 ft3/sack +10% Exs in OH = 2471 sacks
	15,144 MD 7197 TVD			TOC: 2,250 ft All cement volumes are estimates
Revision	1		Note: Not drawn to sc	cale Cement Outside Casing
Date I	Last Revised: 29-Nov-16 Jarrett Toms			Seal Assembly in Annulus

Office of Oil and Gas

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WV Department of Environment 2/09/2016



Purpose

The purpose of this pad-specific Hydraulic Fracturing Monitoring Plan is to identify and notify conventional well operators near Mountaineer Keystone hydraulic fracturing in Harrison County, WV prior to hydraulic fracturing at the following MK wells on the Tony's Bridge 213 Pad.

Due to the apparent presence of unique geological conditions, the potential for communication between deep geologic zones exists in this area. This potential communication, via natural gas, water, or both, may occur between hydraulically fractured wells in the Marcellus formation (approximately 7,200'TVD) and existing conventional natural gas wells in the partially-depleted, relatively high permeability Balltown formation (approximately 3,370' TVD).

The plan is being implemented as an additional safety measure to be utilized in conjunction with best management practices and emergency action plans for this site. These additional measures include pre-notification of conventional well operators of the timing and location of the hydraulic fracturing, establishment of measures conventional well operators should implement, and assurance that the Division of Oil and Gas is notified of the timeline, as well as any issues that may arise during fracturing.

1. Communications with Conventional Operators.

Pay

MK, using available data (WV Geological Survey, WVDEP Website, and IHS data service), has identified all known conventional wells and well operators within 500 feet of this pad and the lateral sections. A map showing these wells along with a list of the wells and operators is included in Attachment A.

Upon approval of this plan, MK will notify these operators, via letter, of the hydraulic fracturing schedule for these wells. A copy of this letter is included in Attachment B. The letter provides recommendations to these conventional operators to 1) increase their monitoring of their wells during that time period, 2) ensure that their well head equipment is sound, and 3) provide immediate notification to MK and the OOG in the event of any changes in their well conditions.

Specifically, the letter recommends that conventional well operators conduct the following activities during and after fracturing operations:

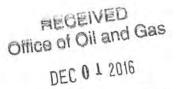
- 1. Inspect their surface equipment prior to fracturing to establish integrity and establish prefrac well conditions.
- 2. Observe wells closely during and after fracturing and monitor for abnormal increases in water, gas or pressure.
- Inspect or install master valves rated to 3,000 psi or other necessary equipment for wellhead integrity.
- 4. Notify the OOG and MK if any changes in water, gas production, pressure or other anomalies are identified.

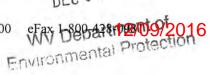


2. Reporting

MK will provide information relating to the hydraulic fracturing schedule, communication with conventional operators, and ongoing monitoring of the work upon request of OOG or immediately after any event of any noted abnormalities.

MES





Well Name	API Number	Operator Name / Address	Well Type	Latitude	Longitude	Total Depth	Perforated Formation(s)	Producing Zones not Perforated
ranklin J. Maxwell #8	033-04454	Bowie, Inc.	Active	39.236604	-80.361303	3510	Fifty foot, Thirty-foot, Fourth, Pitth, Speechley, Balltown	NA
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							TIO O COL	
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							10 10 10	
							1 0 >0	

Rs.

	Area of Review Report	Tonys Bridge	Pad,	213_	_ Lateral,	Harrison	County, WV	
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Well Name	API Number	Operator Name / Address	Well Type	Latitude	Longitude	Total Depth	Perforated Formation(s)	Producing Zones not Perforated
Franklin J. Maxwell #8	033-04454	Bowie, Inc.	Active	39.236604	-80.361303	3510	Fifty-foot, Thirty-foot, Fourth, Fifth, Speechley, Balltown	NA
								-
			7					



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				
Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page

*see attached sheet

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: Mountaineer Keystone, LLC

By: Amy L.Miller 🕧

Its:

Attachment to WW-6A1, Tony's Bridge 213

Designation on Plat	Grantor, Lessor, Assignor, etc.	Grantee, Lessee, Assignee, etc.	Royalty	Book/Page	Acreag
00006603 (WVL03130.001)	Almeta L. Dawson and Donald F. Dawson, her husband	Daniel E. Stalnaker, d/b/a CED Energy	0.12500000	1454/1457	100
	Daniel E. Stalnaker, d/b/a CED Energy	Antero Resources Appalachian Corporation		1462/545	
	Antero Resources Appalachian Corporation	PDC Mountaineer, LLC		1498/1315	
00006604 (WVL03130.002)	Patricia A. Kohler, widow	Daniel E. Stalnaker, d/b/a CED Energy	0.12500000	1454/165	100
	Daniel E. Stalnaker, d/b/a CED Energy	Antero Resources Appalachian Corporation		1462/545	
	Antero Resources Appalachian Corporation	PDC Mountaineer, LLC		1498/1315	
00006601 (WVL03128.000)	Paul S. Hornor, Wallace B. Gribble, and W. F. Dunkin, as Trustees,	Frank J. Maxwell	0.12500000	621/455	1300
	Frank J. Maxwell and Clara G. Maxwell, his wife	W. Brent Maxwell, Jr.		633/234	
	Frank J. Maxwell, widower, and W. Brent Maxwell, Jr. and Marguerite W. Maxwell, his wife	J. Robert Hornor		712/173	
	J. Robert Hornor and Mary Louise Hornor, his wife	Marguerite L. Baker and Helen Baker Billing		714/574	
	Marguerite L. Baker, single, and Helen Baker Bolling, single	J. Robert Hornor		743/423	
	J. Robert Hornor and Mary Louise Hornor, his wife	Marguerite L. Baker and Helen Baker Billing		757/51	
	Marguerite L. Baker, single, and Helen Baker Bolling, single	J. Robert Hornor		757/34	
	J. Robert Hornor and Mary Louise Hornor, his wife	F. S. Kelly, Jr. and H. Stanley Butterworth and Paul Leman		866/236	
	Frank S. Kelly, Jr.	Corinne Roy Kelly (Executrix)		75/1	
	H. Stanley Butterworth and Paul B. Lemann	Corinne Roy Kelly		959/3	
	Corinne Roy Kelly, widow, individually and as Executrix of Frank S. Kelly, Jr., deceased, and J. Robert Hornor, ancillary administrator c.t.a Frank S. Kelly, Jr., deceased	Dal-Ken Corporation		992/601	
Mod	Dal-Ken Corporation	Jerry C. Olds		1050/232	

	Jerry C. Olds	J. Robert Hornor		Unrecorded	Γ
	J. Robert Hornor	Stonewall Gas Company		1073/740	
	Jerry C. Olds	Petroleum Resources, Inc.		1334/17	
	Petroleum Resources, Inc.	MBM Interests, Inc.		1400/463	
	Jerry C. Olds and Constance J. Olds, his wife; MBM Investments, Inc., and Bowie, Inc.	Antero Resources Appalachian Corporation		1458/821	
	Antero Resources Appalachian Corporation	PDC Mountaineer, LLC		1458/1315	·
00006614 (WVL03140.001)	Montaini, Inc.	J. L. Smith Enterprises, Inc.	0.12500000	1375/122	132
	J. L. Smith Enterprises, Inc., d/b/a West Virginia Energies	db Explorations, LLC		1389/247	
	db Explorations, LLC	William W. and Sharon L. Layhue		1415/565 1415/571	
	db Explorations, LLC	Bobby Mitchell		1415/567 1415/573	
	db Explorations, LLC	Donna Sharps		1415/569 1415/575	
	Donna Sharps	db Explorations, LLC		1500/184	
	Bobby Mitchell	db Explorations, LLC		1500/179	
	db Explorations, LLC	Antero Resources Appalachian Corporation		1458/804	
-	Antero Resources Appalachian Corporation	PDC Mountaineer, LLC		1500/458	
00006615 (WVL03140.002)	David J. Harmer and Melba Jo Harmer	J. L. Smith Enterprises, Inc., d/b/a West Virginia Energies	0.12500000	1376/933	132
	J. L. Smith Enterprises, Inc., d/b/a West Virginia Energies	db Explorations, LLC		1389/247	
E n	db Explorations, LLC	William W. and Sharon L. Layhue		1415/565 1415/571	
Office DE Vironme	db Explorations, LLC	Bobby Mitchell		1415/567 1415/573	
PRE DEC Dep men	db Explorations, LLC	Donna Sharps		1415/569 1415/575	
	Donna Sharps	db Explorations, LLC		1500/184	
O L CEI	Bobby Mitchell	db Explorations, LLC		1500/179	
IVED land 2016 Prote	db Explorations, LLC	Antero Resources Appalachian Corporation		1458/804	
Office of Oil and Gas DEC 0 1 2016 WV Department of Environmental Protection	Antero Resources Appalachian Corporation	PDC Mountaineer, LLC		1500/458	

00006616 (WVL03140.003)	James A. Harmer and Betty R. Harmer, his wife	J. L. Smith Enterprises, Inc., d/b/a West Virginia Energies	0.12500000	1376/1154	132
	J. L. Smith Enterprises, Inc., d/b/a West Virginia Energies	db Explorations, LLC		1389/247	
	db Explorations, LLC	William W. and Sharon L. Layhue		1415/565 1415/571	
	db Explorations, LLC	Bobby Mitchell		1415/567 1415/573	
	db Explorations, LLC	Donna Sharps		1415/569 1415/575	
	Donna Sharps	db Explorations, LLC		1500/184	
	Bobby Mitchell	db Explorations, LLC		1500/179	
	db Explorations, LLC	Antero Resources Appalachian Corporation		1458/804	
	Antero Resources Appalachian Corporation	PDC Mountaineer, LLC		1500/458	
00006617 (WVL03140.004)	Nelson W. Spengler, Jr. and Margaret H. Spengler, co-Executors to the Estate of Nelson W. Spengler, Sr.	J. L. Smith Enterprises, Inc., d/b/a West Virginia Energies	0.12500000	1388/1178	132
	J. L. Smith Enterprises, Inc., d/b/a West Virginia Energies	db Explorations, LLC		1389/247	
	db Explorations, LLC	William W. and Sharon L. Layhue		1415/565 1415/571	
	db Explorations, LLC	Bobby Mitchell		1415/567 1415/573	
	db Explorations, LLC	Donna Sharps		1415/569 1415/575	
	Donna Sharps	db Explorations, LLC		1500/184	
	Bobby Mitchell	db Explorations, LLC		1500/179	
	db Explorations, LLC	Antero Resources Appalachian Corporation		1458/804	
Envir C	Antero Resources Appalachian Corporation	PDC Mountaineer, LLC		1500/458	

RECEIVED
Office of Oil and Gas
DEC 0 1 2016
WV Department of
represental Protection



Agreement to Drill, Complete and Operate Oil & Gas Wells

This Agreement to Drill, Complete and Operate Oil & Gas Wells (this "Agreement"), by and among Mountaineer Keystone LLC, a West Virginia limited liability company ("Mountaineer Keystone"), PDC Mountaineer, LLC, a Delaware limited liability company ("PDC"), and PDC Mountaineer Holdings, LLC, a Delaware limited liability company ("PDC Holdings"), is effective as of October 15, 2014. (the "Effective Date") and sets forth the terms pursuant to which Mountaineer Keystone will drill, complete and operate the Wells (as defined below) on behalf of PDC and PDC Holdings. Mountaineer Keystone, PDC, and PDC Holdings are each a "Party" and are collectively the "Parties". In consideration of the foregoing and the respective agreements hereinafter set forth and the mutual benefits to be derived therefrom, the Parties, intending to be legally bound, hereby agree as follows:

- 1. Term: This Agreement is effective from the Effective Date until terminated by Mountaineer Keystone on the one hand or PDC and PDC Holdings on the other hand with 30 days' written notice to the other Party or Parties, as applicable (the "Term").
- 2. Authorization to Operate: PDC and PDC Holdings authorize Mountaineer Keystone to undertake and perform, on PDC and PDC Holdings behalf, all operations, including without limitation permit applications, well pad preparation, drilling and completing wells, and marketing gas, oil and other hydrocarbons therefrom with respect to all oil and gas wells to be drilled on oil and gas leasehold acreage held by PDC or PDC Holdings. PDC, PDC Holdings and Mountaineer Keystone are affiliates with a common parent. Mountaineer Keystone was formed to operate oil and gas leasehold acreage held by PDC, PDC Holdings and certain other affiliates. Mountaineer Keystone agrees that it shall, in a good and workmanlike manner and in accordance with industry standards as they prevail in the area, drill, complete and operate oil and gas wells on leasehold acreage owned by PDC or PDC Holdings from time to time as directed by PDC or PDC Holdings (collectively, the "Wells").
- 3. No Third Party Beneficiary: This Agreement is for the benefit of the Parties and is not for the benefit of any third party.
- 4. Counterparts: This Agreement may be simultaneously executed in several counterparts and via facsimile or similar electronic transmittal, each of which shall be deemed to be an original and taken together shall constitute one and the same instrument.

[Signature Page Follows]

Mes

IN WITNESS WHEREOF, Mountaineer Keystone, PDC, and PDC Holdings have caused their duly authorized representatives to execute this Agreement as of the Effective Date.

MOUNTAINEER KEYSTONE LLC

Name: Robert Kozo

Title: CEO

PDC MOUNTAINEER, LLC

Name: Robert Kozel

Title: CEO

PDC MOUNTAINEER HOLDINGS, LLC

By: Name: Robert Koze/

Title: CEO

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