

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

January 04, 2016

EQT PRODUCTION COMPANY 120 PROFESSIONAL PLACE BRIDGEPORI, WV 26330

Re: Permit Modification Approval for API Number 9502281, Well #: 512893

Adjust FW and INT. Casing

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

Assistant Chief of Permitting

Office of Oil and Gas

Promoting a healthy environment.



October 23, 2015

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

Re: Modification of 095-02278, 02279, 02280, 02281

Dear Mr. Smith,

Enclosed are modifications of the above API numbers located on the WEU4 pad. EQT would like to adjust the casing on the Fresh water and Intermediate casing to match the others in for permit currently. Everything else remains the same.

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

Sincerely,

Vicki Roark

Permitting Supervisor-WV

Enc.

4709502281 MOP

(4/15)

4709502281

API NO.	47		095		02281
OPERATO	RWE	LL NO			512893
Well Pad Name:					WEU4

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

1) Well Operator: EQT Production	on Company		306686	095	1	671
			Operator ID	County	District	Quadrangle
2) Operator's Well Number:		512893		_Well Pad Name	W	EU4
3) Farm Name/Surface Owner :		Donna J. Pete	r	_Public Road Acc	cess:	WV-18
4) Elevation, current ground:	1,092.0	Elevati	on, proposed po	ost-construction:	1,079.0	
5) Well Type: (a) Gas	Oil	Unc	lerground Stora	ge		
Other						
(b) If Gas:	Shallow		Deep			
H	Horizontal				Dat	+
6) Existing Pad? Yes or No:	No				PM+ 11-1	3-15
7) Proposed Target Formation(s), [Depth(s), Anti	cipated Thickne	esses and Asso	ciated Pressure(s	s):	
the state of the s				54 feet and anticip		of 2747 PSI
			Marcellus 6649.			
3) Proposed Total Vertical Depth:				6680		
9) Formation at Total Vertical Depti						
Proposed Total Measured Dept						
 Proposed Horizontal Leg Lengt 	h					
Approximate Fresh Water Strat	a Depths:					
(4) Method to Determine Fresh Wa	ater Depth:			132, 175, 186, By offset wel		
(4) Approximate Saltwater Depths:	Vice-			8, 1219, 1222		
Approximate Coal Seam Depth	s:			230, 281, 696		
6) Approximate Depth to Possible	Void (coal mi	ne, karst, other	·):		None reporte	h
7)Does proposed well location cor	ntain coal sea	ms directly ove	rlying or			
adjacent to an active mine?			Yes		No x	
(a) If Yes, provide Mine Info:	Name:				<u>.</u>	
	Depth:					
	Seam:					
	Owner:					
	0.					

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WV Department of Environmental Protection

WW	-	6B
(4/15)	

4709502281

API NO.	47	-	095	 02281
OPERATO	RWE	LL NO		512893
Well Pag	d Nar	ne:		WEU4

CASING AND TUBING PROGRAM

TYPE	Size	New	Grade	Weight per ft.	FOOTAGE: For	INTERVALS:	CEMENT:
	<u>(in)</u>	<u>or</u>		(lb/ft)	Drilling (ft)	Left in Well	Fill- up (Cu.Ft.)
		Used				<u>(ft)</u>	
Conductor	20	New	MC-50	81	40	40	38 C.T.S.
Fresh Water	13 3/8	New	J-55	54.5	750	750	660 C.T.S.
Coal	-	-	-	_	_	-	_
Intermediate	9 5/8	New	A-500	40	2,865	2,865	1,126 C.T.S.
Production	5 1/2	New	P-110	20	10,425	10,425	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TD
Liners							

TYPE	Size (in)	Wellbore	Wall	Dn I+ Burst Pressure	//-/3-15 Anticipated	Cement	Cement Yield
		Diameter (in)	<u>Thickness</u>	<u>(psi)</u>	Max. Internal	<u>Type</u>	(cu. ft./k)
			<u>(in)</u>		Pressure (psi)		
Conductor	20	24	0.375	-	18	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,730	2184	* See Note 2	1.21
Coal							
Intermediate	9 5/8	12 3/8	0.395	3,950	3160	* See Note 2	1.21
Production	5 1/2	8 1/2	0.361	12,640	10112	-	1.27/1.86
Tubing							
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.

Note 2: Reference Variance 2014-17. (Attached)

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4709502281 MoV RECEIVED Office of Oil and Gas

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01/08/2016

WW - 6B	APINO. <u>47</u> - <u>095</u>	02281
(10/14)	OPERATOR WELL NO.	512893
4709502281	Well Pad Name:	WEU4
19) Describe proposed well work, including the drilling and plugging back of any pilot hole:		
Drill and complete a new horizontal well in the Marcellus formation. The vertical drill to go down to an approx	imate depth of 4684'.	
Then kick off the horizontal leg into the Marcellus using a slick water frac.		
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure ar		
Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractur freshwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including	red wells and obtained from	
gelling agent, gel breaker, friction reducer, biocide, and scale inhibitor), referred to in the industry as a "slickwater"	completion. Maximum	
anticipated internal casing pressures is expected to average approximately 8500 psi, maximum anticipated treating	g rates are expected to average	
approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 200,000 barrels of water vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per stage.	er per stage. Sand sizes	
, , , , , , , , , , , , , , , , , , ,		
21) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres):	19.18	
22) Area to be disturbed for well pad only, less access road (acres):	10.17	
23) Describe centralizer placement for each casing string.	13.17	
Surface: Bow spring centralizers – One at the shoe and one spaced every 500'. Intermediate: Row spring controllings. One and the shoe and one spaced every 500'.		
 Intermediate: Bow spring centralizers— One cent at the shoe and one spaced every 500'. Production: One spaced every 1000' from KOP to Int csg shoe 		
OA) Describe all and the little		
24) Describe all cement additives associated with each cement type. Used to speed the setting of cement slurries. Surface (Type 1 or 1)	Cement): 0-3% Calcium Chloride	
0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of the cement slurry to a thief	zone	
Intermediate (Type 1 Cement): 0-3% Calcium Chloride. Salt is used in shallow, low temperature formation	s to speed the setting of cement	
slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of whole drilling fluid to a thief zone.	or cement slurry (not filtrate)	
Production:	M)	
<u>Lead (Type 1 Cement)</u> : 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.	1-17-15	
0.3% CFR (dispersant). Makes cement easier to mix.		
Tail (Type H Cement): 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening 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.	09502281 A	LOD
25) Proposed borehole conditioning procedures. <u>Surface: Circulate hole clean (Approximately 30-</u>	45 minutes) rotating & reciprocating	
one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, continue to		
minutes. To ensure that there is no fill, short trip two stands with no circulation. If there is fill, bring co		
and circulate hole clean. A constant rate of higher than expected cuttings volume likely indicates was	houts that will not clean up.	
Intermediate: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until		
surface. When cuttings returning to surface diminish, continue to circulate an additional 5 minutes. If	foam drilling, to enhance	
hole cleaning use a soap sweep or increase injection rate & foam concentration.		
<u>Production:</u> Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes both	ttoms up volume	
Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean. Check volume of c	cuttings coming across and Gas	3
the shakers every 15 minutes.	Office of Off and Clark	

*Note: Attach additional sheets as needed.

WV Department of Environmental Protection

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Weil 512893(WEU4H4)
EQT Production
West Union
Tyler
West Virgina 7,500 7,250 7,000 6,500 5,750' 5,000 3,000 2,250 1,750 Proposed Well Work:

Drill and complete a new horizontal well in the formation.

The vertical drill to go down to an approximate depth of 4884.

Then kick off the horizontal leg into the using a slick water frac. West Virgina Target Inside Marcellus Marcellus Bottom -Sonyea
-Middlosex
-Genesee
-Genesee
-Tully
-Hamilton Base Fresh Water Base Red Rock Big Linus
West
-Gantz
-Fifty foot
-Thirty foot
-Gerdenn
Int. csg pt
-Forth Sand
-Fifth Sand
-Bayard
-Warren Formation Tops (TVD) 5242 - 5324 4574 2841 2954 3011 3374 3460 Azimuth 335 Vertical Section 3444 6649 6873 2865 1101 204 6449 6496 6570 6605 6626 8649 5058 4864 4088 2967 2967 3148 3440 3574 2395 2450 2507 2650 2744 2815 2037 (2000") (1000') (3000" Land curve @ 6,673' ft TVD 7,555' ft MD KOP @ 4,684 2,870" ft Lateral 4709502281 MOD Est. TD @ 6,673 ft TVD 10,425 ft MD 8 1/2 Hole Size (Inches) 24 12 3/8 17 1/2 **Production Casing** Intermediate Conductor Casing Type 5 1/2 9 5/8 40#/A-500 20#/P-110 Wt (ppf)/Grade 81#/MC-50 54.5#/J-55 RECEIVED Office of Oil and Gas NOV 1 8 2015

> Fredronmental Protection 01/08/2016

WV Department of

Well Schematic EQT Production 4709502281

EQT Production Well Name 512893(WEU4H4) Elevation KB: 1092 County Target Prospect Tyler West Virgina Azimuth Vertical Section 0' Hole Size 24" - 20" Conductor at 40" 204' Fresh Water Base Bit Size 17.5" 500' -TOC @ Surface - 500 13 3/8", MC-50, 54 5# @ 750' ft MD Bit Size 12.375* 1,000' — 1,101' Base Red Rock - 1,000 1.500' --- 1,500 1.838' Maxton 2,000' — 2,111' Big Lime - 2,000 2,403' Weir 2,500' — 2,490' -Gantz 2,604' -Fifty foot ___ 2.500' 2,690 -Thirty foot 2,770' -Gordon 2,865' Int. csg pt 3,000' — 2,841' -Forth Sand 2,954' -Fifth Sand TOC @ Surface - 3.000" 9 5/8", MC-50, 40# @ 2,865' ft MD 3,011' -Bayard Bit Size 8.5* 3,374' -Warren 3,500' - 3,460' -Speechley - 3,500 DAH 4,000' - 3,976' -Balltown A 11-13-15 - 4,000 4,500' — _{4,574'} -Riley - 4,500 KOP = 4,684' ft MD 10 Deg DLS 5,000' — 4,995' -Benson - 5,000 4709502281 MOD 5,242' -Alexander 5.500' -6,000' — 6,328' - 6.000 -Sonyea -Middlesex 6,496 -Genesee 6,570 -Geneseo 6,500' — 6,605' -Tully 6,626' -Hamilton 6,673' ft TVD - 6,500 6,649 -Marcellus 5 1/2", P-110, 20# 10,425" ft MD 6,702' Onondaga 6,673' ft TVD

- 7,000

7,000' -

7,500' — — 7,500'

8,000° — — — 8,000°

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WV Department of Protection



October 1, 2015

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

Re: Casing change on WEU4 (512890, 512891, 512892, 512893)

Dear Mr. Smith,

EQT is requesting the 13 3/8" surface casing to be set at 750' KB, 50' below the coal at 696-700' KB. We will set the 9-5/8" intermediate string at 2865' KB, 50' below the base of the Gordon.

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

Sincerely,

Vicki Roark

Permitting Supervisor-WV

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NOV 1 8 2015

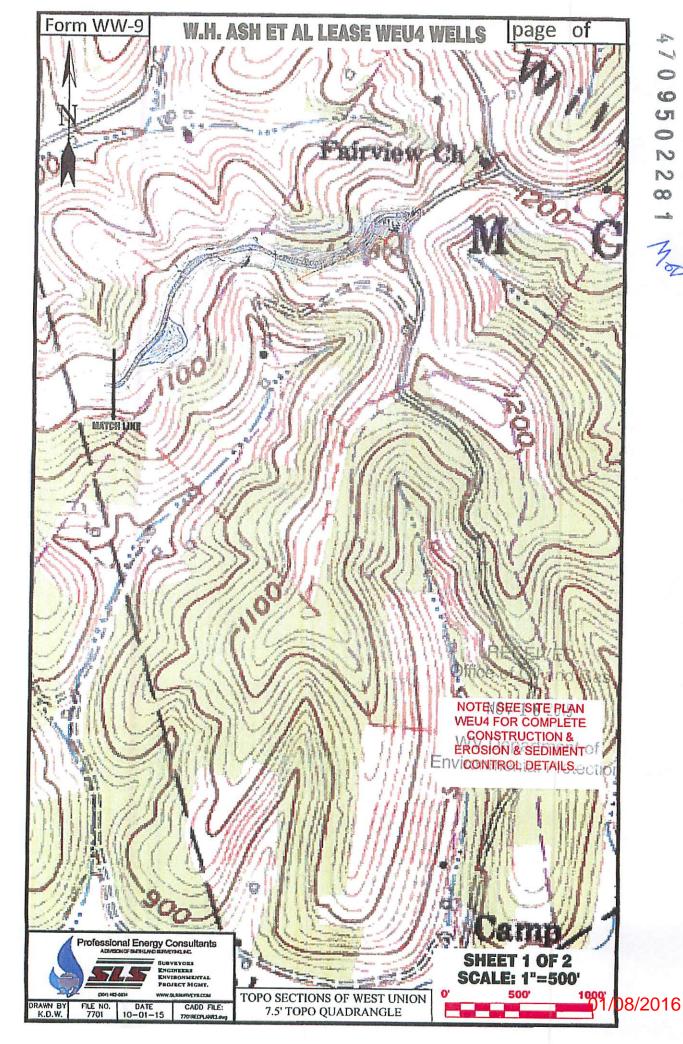
WV Department of Environmental Protection

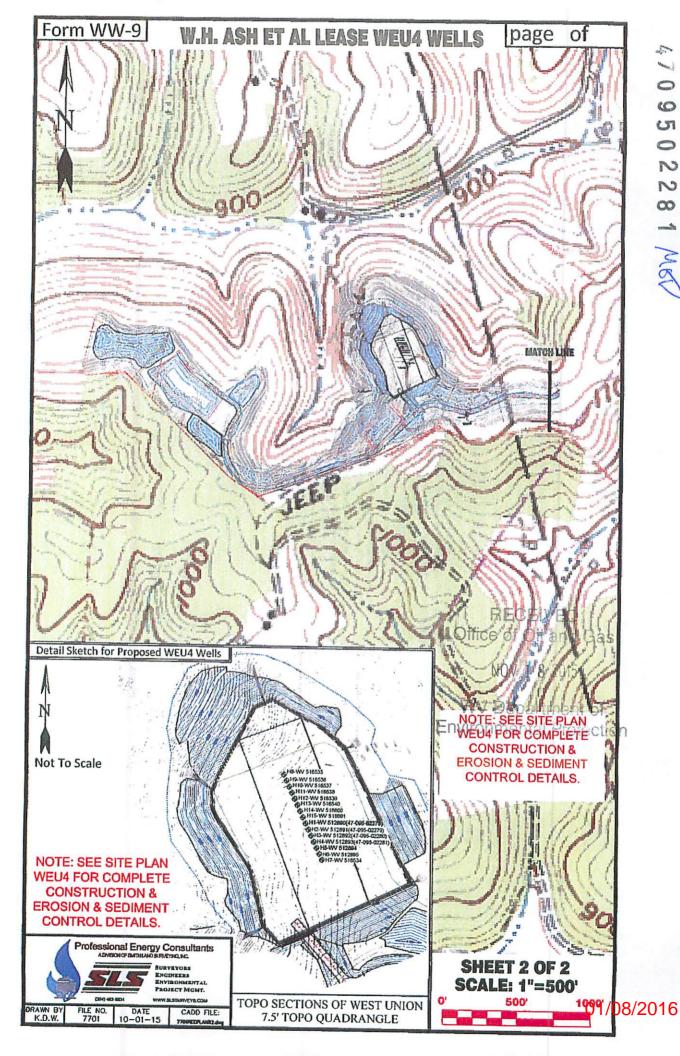
Enc.

4709502281 MOD

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NOV 1 8 2015





Brewer, Charles T

From:

Brewer, Charles T

Sent:

Tuesday, December 01, 2015 9:46 AM

To:

'Roark, Vicki'

Subject:

WEU 4 Mods

Hey Vicki,

I just took a look at the mods you have in for WEU 4, in which you have asked to change the FW and intermediate casing strings to match the apps that recently came in. This will be fine, but you will need to re-notify the coal folks because a different string will now be covering the coal seams that you have (all covered by 13 3/8's now). Originally one seam was covered by your intermediate which is now being shortened as well. Anyways, you know the routine, I will need the certified mail receipts and either the waivers from them or we can wait the 30 days.

Thanks,

Taylor

Taylor Brewer, B.S., M.S.

Environmental Resource Specialist 3 Permit Review WVDEP Office of Oil and Gas 601 57th Street, SE Charleston, WV 25304 304-926-0499 ext. 1547

THE ITEMS REQUESTED IN THIS EMAIL WILL NEED TO BE RECEIVED BY THE OFFICE OF OIL AND GAS WITHIN **20 DAYS** TO AVOID THE PERMIT APPLICATION BEING RETURNED. IF AN OPERATOR WISHES TO RESUBMIT AN APPLICATION THAT HAS BEEN RETURNED, THE OPERATOR IS REQUIRED TO COMPLETE AND SUBMIT NEW FORMS, MYLAR PLAT AND ASSOCIATED FEES.

47095022° MOV

WW-6A (9-13)

API NO. 47	- 095	02281
OPERATOR WELL	512893	
Well Pad Name:	WEU4	

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS NOTICE OF APPLICATION

Notice Time Requirement: notice shall bute of Notice:	Date Permit Application Files	
Notice of:		
PERMIT FOR ANY WELL WORK	☐ CERTIFICATE OF APPROV	
Delivery method pursuant to West Vi	rginia Code § 22-6A-10(b)	
		THOD OF DELIVERY THAT REQUIRES A CEIPT OR SIGNATURE CONFIRMATION
for the construction of an impourequires a receipt or signature coplat to each of the following persthe surface tract or tracts overlying disturbance as described in the elessee, in the event the tract of larecord of the surface tract or tract construction, enlargement, alterawater purveyor who is known to which is used to provide water fework activity is to take place. (c) in the lands, the applicant may searticle one, chapter eleven-a of the unless the lien holder is the lands the surface owner and any water	ndment or pit as required by the infirmation, copies of the applicants: (1) The owners of recording the oil and gas leasehold be rosion and sediment control pland on which the well proposed to overlying the oil and gas leastion, repair, removal or abandothe applicant to have a water wor consumption by humans or (1) If more than three tenants force the documents required up its code. (2) Notwithstanding owner. W. Va. Code R. § 35-8	date of the application, the applicant for a permit for any well work or for a his article shall deliver, by personal service or by registered mail or by any location, the erosion and sediment control plan required by section seven of a of the surface of the tract on which the well is or is proposed to be located; being developed by the proposed well work, if the surface tract is to be used an submitted pursuant to subsection (c), section seven of this article; (3) The dot to be drilled is located [sic] is known to be underlain by one or more coal usehold being developed by the proposed well work, if the surface tract is to comment of any impoundment or pit as described in section nine of this well, spring or water supply source located within one thousand five domestic animals; and (6) The operator of any natural gas storage field in common or other co-owners of interests described in subsection (b) of pon the person described in the records of the sheriff required to be any provision of this article to the contrary, notice to a lien holder is not 15.7.a requires, in part, that the operator shall also provide the Well Site object to notice and water testing as provided in section 15 of this rule. Well Plat Notice is hereby provided to:
SURFACE OWNER(s) Name: Address:	Donna J Peter 733 Ridge Rd Wilbur WV 26320	COAL OWNER OR LESSEE Name: Address: Address: Address:
Name: Address:		COAL OPERATOR Name: Address:
SURFACE OWNERS(s) (Re Name: Address:	Donna J Peter 733 Ridge Rd Wilbur WV 26320	SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s) Name: Donna J Peter
Name: L. Bruce a Address: See attached for additional s	RR1 Box 304-BB Elkins WV 26241 surface (road/ disturbance)	Address: 733 Ridge Rd Wilbur WV 26320 See attached for additional water purveyors
SURFACE OWNER(s) (Imp	poundments/Pits)	OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name: Address:	Donna J Peter 733 Ridge Rd Wilbur WV 26320	Name: Address:

095-02281

WW6-A Additional Coal Owners

Rosemary Brandon 3013 Delaware Avenue Kenner, LA 70065

Surface Owners(road or other disturbance):

James B. and Brenda J. Stoneking 2 Deerhaven Drive Wheeling WV 26241

Diane L. Morgan and Glenn W. Morgan 590 Isner Creek Road Elkins WV 26241

Richard and Yvonne Metcalf 128 Village Drive Bridgeport WV 26330

Surface Owners(Pits or impoundments):

Richard and Yvonne Metcalf 128 Village Drive Bridgeport WV 26330

Additional Water Purveyors

Bruce Stoneking R.D. 1 Box BB Elkins WV 26241

Frank and Elizabeth Abruzzino 91 Springhill Chapel Road Clarksburg, WV 26301 4709502281 MOD

WW-6AW
(1-12)

API NO. 47 -	095	-	02281
OPERATOR WELL	NO.	_	512893
Well Pad Name:			WEU4

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS VOLUNTARY STATEMENT OF NO OBJECTION

Instructions to Persons Named on Page WW-6A

The well operator named on page WW-6A is applying for a permit from the State of West Virginia to conduct oil or gas well work. Well work permits are valid for twenty-four (24) months. Please contact the listed well operator and the Office of Oil and Gas if you do not own any interest in the listed surface tract.

Comment and Waiver Provisions

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary.

Pursuant to West Virginia Code § 22-6A-8(b) No permit may be issued less than thirty days after the filing date of the application for any well work except plugging or replugging; and no permit for plugging or replugging or replugging fray be issued less than five days after the filing date of the application except a permit for plugging or replugging a dry hole: Provided, That if the applicant certifies that all persons entitled to notice of the application under the provisions of subsection (b), section ten of this article have been served in person or by certified mail, return receipt requested, with a copy of the well work application, including the erosion and sediment control plan, if required, and the well plat, and further files written statements of no objection by all such persons, the secretary may issue the well work permit at any time.

VOLUNTARY STATEMENT OF NO OBJECTION

hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated

provisions liste	ed above, and that I have received copies of a	Notice of Application, an Ap	Application for a Well Work Permit on Form	
WW-6A and attachments consisting of pages one (1) through			, including the erosion and sediment control plan, if	
required, and t	the well plat, all for proposed well work on the	tract of land as follows:	4709502281 MOT	
State:	WV	WV UTM NAD 83 Easting:	ng: 515,453.34	
County:	Tyler	UTM NAD 83 Northin	ing: 4,357,467.22	
District:	Centerville	Public Road Access:	s: WV-18	
Quadrangle:	West Union 7.5'	Generally used farm i	n name: Donna J. Peter	
Watershed:	Tributary of Camp Mistake Run	_		
133000 OII UII	ose materials.			
*Please check the box that applies		100	FOR EXECUTION BY A NATURAL PERSON	
☐ SURFACE OWNER			Signature Kasemury Brandon	
☐ SURFACE OWNER (Road and/or Other Disturbance)			Print Name: ROSEMARY BRANDON	
☐ SURFACE OWNER (IMPOUNDMENTS/PITS) ☐ COAL OWNER OR LESSEE ☐ COAL OPERATOR			Date: 12-13-2015	
			FOR EXECUTION BY A CORPORATION, ETC.	
			Company:	
WATER PURVEYOR			By:	

Signature: Date:

Oil and Gas Privacy Notice:

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov