

#### 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

September 16, 2014

### WELL WORK PERMIT

#### Horizontal 6A Well

This permit, API Well Number: 47-10303014, issued to EQT PRODUCTION COMPANY, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

Chief

Operator's Well No: 515288

Farm Name: HENTHORN, DENCIL ET AL

API Well Number: 47-10303014

Permit Type: Horizontal 6A Well

Date Issued: 09/16/2014

#### PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

#### **CONDITIONS**

- 1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
- 2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
- 3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
- 4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
- 5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled Water Well Regulations, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
- 6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
- 7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
- 8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
- 9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

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

i) Well Operator: EQT Produc	tion Company			103	4	[ 254
			Operator ID	County	District	Quadrangle
2) Operator's Well Number:		515288		Well Pad Name	:BI	G367
3) Farm Name/Surface Owner :	Denc	il Henthorn	et al	_Public Road Ac	cess:	Rt. 74
4) Elevation, current ground:	1,475.5	Elevati	on, proposed po	st-construction:	1,442.9	
5) Well Type: (a) Gas	Oil	Unc	lerground Stora	ge		<del>,</del>
Other				7		
(b) If Gas:	Shallow	•	Deep			
	Horizontal	<u>.                                    </u>				
6) Existing Pad? Yes or No:	vės:					
7) Proposed Target Formation(s),  Target formation is Marcellus					· ·	of 4801 PSI
8) Proposed Total Vertical Depth:				7,574		
9) Formation at Total Vertical Dep				Aarcellus		
10) Proposed Total Measured De				13,505	<del></del>	
11) Proposed Horizontal Leg Leng		_		4,493		
12) Approximate Fresh Water Stra				433, 478, & 70	95	
13) Method to Determine Fresh W	ater Depth:			By offset wells		
14) Approximate Saltwater Depths	s:		1965,	2130, & 2168		
15) Approximate Coal Seam Dept	hs:		513, 727, 831	, 882, 1019, 119	0, & 1680	
16) Approximate Depth to Possible	•		•		None reporte	od
17)Does proposed well location	contain coal sea	ıms directiy	overlying or			
adjacent to an active mine?						
(a) If Yes, provide Mine Info:	Name:					
	Depth:					
	Owner:				<del></del>	<u>.</u>

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DAH 7-14-14

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#### **CASING AND TUBING PROGRAM**

TYPE	Size	New	Grade	Weight per	FOOTAGE:	INTERVALS:	CEMENT:
		<u>or</u> Used	<u> </u>	ft.	for Drilling	Left in Well	Fill- up (Cu.Ft.)
Conductor	26	New	MC-50	81	80	80	98 C.T.S.
Fresh Water	13 3/8	New	MC-50	54	956	956	832 C.T.S.
Coal							
Intermediate	9 5/8	New	MC-50	40	2,900	2,900	1,134 C.T.S.
Production	5 1/2	New	P-110	20	13,505	13,505	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TO
Liners							

Dn# 7-14-14

TYPE	Size	Wellbore Diameter	<u>Wall</u> Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	26	30	0.312	•	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						
Liners						

#### <u>Packers</u>

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:
Drill and complete a new horizontal well in the Marcellus Formation. The vertical drill to go down to an approximate depth of 5,409'.
Then kick off the horizontal teg into the Marcellus using a slick water frac.
CON Deposits front value / New Johnson at the de to de tall front ville and the de to de t
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:
Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from freshwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid,
gelling agent, gel breaker, friction reducer, blockle, and scale inhibitor), referred to in the industry as a "slickwater" completion. Maximum
anticipated treating pressures are expected to average approximately 8500 psl, maximum anticipated treating rates are expected to average approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 200,000 barrels of water per stage. Sand sizes
vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per stage.
21) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): no additional disturbance
22) Area to be disturbed for well pad only, less access road (acres): no additional disturbance
Describe centralizer placement for each casing string.     Surface: Bow spring centralizers – One at the shoe and one spaced every 500'.
<ul> <li>Intermediate: Bow spring centralizers          One cent at the shoe and one spaced every 500'.</li> </ul>
Production: One spaced every 1000' from KOP to Int csg shoe
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 cement 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 of whole drilling fluid or cement slurry (not filtrate)
to a thief zone.
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 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% Haiad (fluid loss). Reduces amount of water lost to formation.
25) Proposed borehole conditioning procedures. <u>Surface</u> : Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating
one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, centinue to circulate an additional 5
minutes. To ensure that there is no fill, short trip two stands with no circulation. If there is fill, bring compressors back on
and circulate hole clean. A constant rate of higher than expected cuttings volume likely indicates washouts that will not clean up.
Intermediate: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until cuttings diminish at
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.
Production: Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes bottoms up volume.
Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean. Check volume of cuttings coming across
the shakers every 15 minutes.
*Note: Attach additional sheets as needed.

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Environmental Protection



August 14, 2014

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

Re: Casing Plan on Wells (BIG367) 47-103-03014, 03015, 03016, 03017

Dear Mr. Smith,

EQT is requesting the 13-3/8" surface casing be set at 956' KB, 50' below the red rock formation at 906' without setting below elevation. The previous wells drilled on this pad set 13-3/8" casing at approximately 956' KB. This will cover up red rock formations that have given EQT drilling issues in the past. We will set the 9-5/8" intermediate string at 2900' KB, into the Weir formation. The previous wells drilled on this pad set 9-5/8" casing at approximately 2900' KB.

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

Sincerely,

Vicki Roark

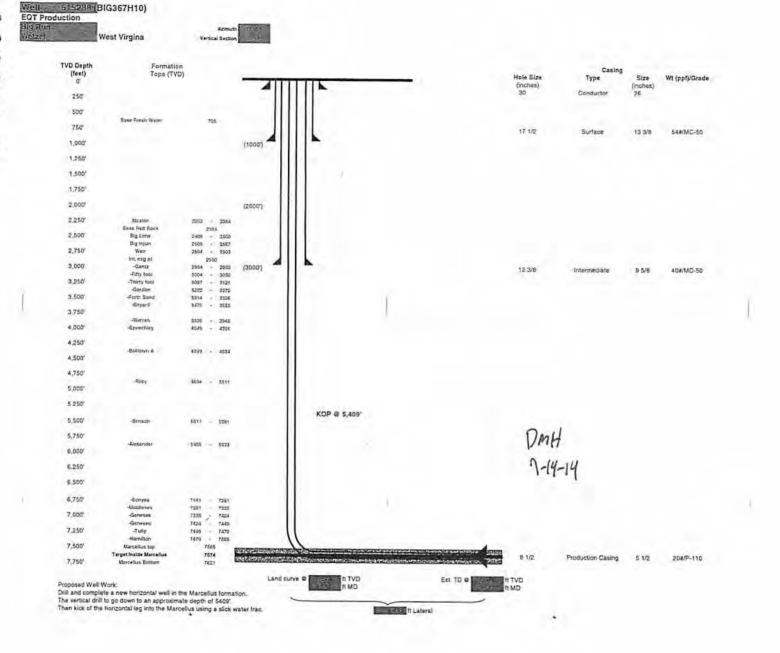
Permitting Supervisor

Enc.

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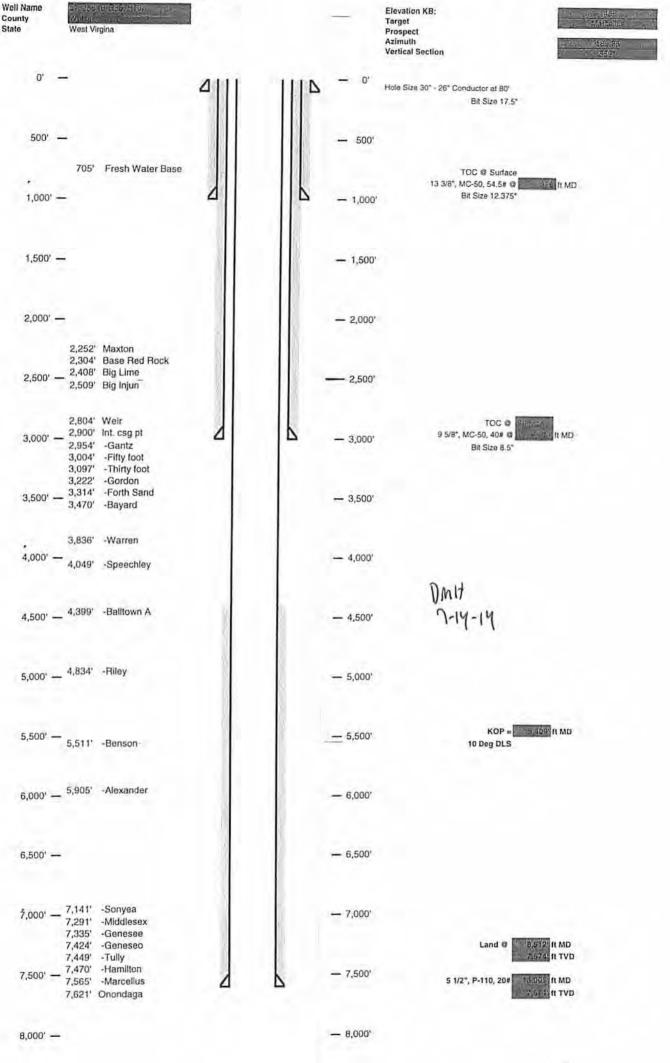
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WW-9 (5/13)

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API No. 47	103	=	0
Operator's We	ell No.		515288

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

#### Fluids/Cuttings Disposal & Reclamation Plan

Operator Name	BIG367	OP Code _	
Watershed (HUC10)	North Fork of Fishing Creek	Quadrangle	Big Run 7.5'
Elevation 14	42.9 County	Wetzel Distric	d Grant
Do you anticipate using mo	ore than 5,000 bbls of water to c	omplete the proposed wel	l work? Yes x No
Will a pit be used ? Yes: _	No:X		
If so please descrit	be anticipated pit waste:		
Will a synthetic line	er be used in the pit? Yes	No <u>X</u> I	so, what ml.? 60
Proposed Dispos	al Method For Treated Pit WasteLand Application		
	Underground Injection ( Reuse (at API Number	UIC Permit Number	0014, 8462, 4037
•	Off Site Disposal (Supply Other (Explain	form WW-9 for disposal I	ocation)
• •	e used ? Yes, The closed loop s		gs from the drilling
Drilling medium anticipat	ed for this well? Air, freshwater,	•	
		<del></del>	ediate, and Pilot hole sections, water based
If oil based, wh	at type? Synthetic, petroleum, et		drill the curve and lateral.
•	ling medium? MILBAR, Viscos		
	int, Defoaming, Walnut Shell, X-Cide, SC		
<del></del>	ir: lubricant, detergent, defoaming. Wa		
	, chloride salts, rate filtration control, defi	occulant, lubricant, detergent, o	defoaming, walnut shell,
x-cide, SOLTEX terra	thod? Leave in pit, landfill, remov	ved offsite etc	Landfill
	an to solidify what medium will be used?		n/a
	name/permit number?	See Attache	ed List
	•		
on August 1, 2005, by the Office provisions of the permit are enforor regulation can lead to enforce I certify under penalty of application form and all attachments the information, I believe that the	aw that I have personally examined and ents thereto and that, based on my inqui a information is true, accurate, and comp	artment of Environmental Protect condition of the general permit a car familiar with the Information ry of those individuals immediate lete. I am aware that there are second	ction. I understand that the and/or other applicable law submitted on this ely responsible for obtaining
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•	reatment: Acres Distu	urbed <u>no additional</u>	Prevegetation p	Н6
Lime	3 Tons/a	cre or to correct to pH	6.5	
Fertilize type		<del></del>		
Fertilizer Amount	t <u>1/3</u>	lbs/acre (500 lbs minimum)		
Mulch	2	Tons/acre		
		Seed Mixtures		
Tem Seed Type (Y-31	porary Ibs/acre 40	Seed Type Orchard Grass		bs/acre 5
Alsike Clover	5	Alsike Clover	5	<u> </u>
Annual Rye	15			
Attach: Drawing(s) of road, locatio		•		
		•		
Drawing(s) of road, locatio	olved 7.5' topographi	•		
Drawing(s) of road, locatio	olved 7.5' topographi	•		
Photocopied section of inv	colved 7.5' topographi	•		
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Office of Oil and Gas

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# EQT Production Water plan Offsite disposals for Marcellus wells

#### CWS TRUCKING INC.

P.O. Box 391 Williamstown, WV 26187 740-516-3586 Noble County/Noble Township Permit # 3390

#### LAD LIQUID ASSETS DISPOSAL INC.

226 Rankin Road Washington, PA 15301 724-350-2760 724-222-6080 724-229-7034 fax Ohio County/Wheeling Permit # USEPA WV 0014

#### TRI COUNTY WASTE WATER MANAGEMENT, INC.

1487 Toms Run Road Holbrook, PA 15341 724-627-7178 Plant 724-499-5647 Office Greene County/Waynesburg Permit # TC-1009

#### Waste Management - Meadowfill Landfill

Rt. 2, Box 68 Dawson Drive Bridgeport, WV 26330 304-326-6027 Permit #SWF-1032-98 Approval #100785WV

#### **Waste Management - Northwestern Landfill**

512 E. Dry Road
Parkersburg, WV 26104
304-428-0602
Permit #SWF-1025 WV-0109400
Approval #100833WV

#### **BROAD STREET ENERGY LLC**

37 West Broad Street
Suite 1100
Columbus, Ohio 43215
740-516-5381
Washington County/Belpre Twp.
Permit # 8462

#### **TRIAD ENERGY**

P.O. Box 430 Reno, OH 45773 740-516-6021 Well 740-374-2940 Reno Office Jennifer Nobel County/Jackson Township Permit # 4037

#### KING EXCAVATING CO.

Advanced Waste Services 101 River Park Drive New Castle, Pa. 16101 Facility Permit# PAR000029132

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## Site Specific Safety Plan

## EQT BIG 367 Pad

<u>Jacksonburg</u>

Wetzel County, WV

_515288	515643	515644	For Wells: 515645_		
Decmitting	Spera	_	repared:	June 18, 2014  WV Oil and Gas Inspe  Oil + Gar	ctor
Date 6-23-1	9	_		)-/4-/4 Date	

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