

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

August 06, 2013

EQT PRODUCTION COMPANY POST OFFICE BOX 280 BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 1706186 , Well #: 514654 changed target formation

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

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

1) Well Operator:	EQT Produ	action Company			017	6	611
, p =	_=			Operator ID	County	District	Quadrangle
2) Operator's Well	Number:		514654		_Well Pad Name	SN	1128: .
3 Elevation, current	t ground:	1,254	_ Eleva	ation, proposed p	ost-construction:	1,254	
4) Well Type: (a) G	as •	Oil					
0	ther			· · · · · · · · · · · · · · · · · · ·			
(b)	If Gas:	Shallow	•	Deep			
		Horizontal	•				
5) Existing Pad? Ye	es or No:	yes					
6) Proposed Targe	t Formation(s	s), Depth(s), Ant	icipated Thic	knesses and As	sociated Pressure	e(s):	
	•		·		be 40 feet and anticipa	•	ure of 4482 PSI
7) Proposed Total \	Vertical Dept	h:			7182'		
) Formation at Tot	tal Vertical D	epth:			Onondaga		
) Proposed Total I	Measured De	epth:			12,682'	-	
10) Approximate Fr	esh Water S	Strata Depths:		22, 81,100,12	23,260,285,366,39	0,427,478,50	0,570
11) Method to Dete	rmine Fresh	Water Depth:	By offset v	/ells			
l2) Approximate Sa	altwater Dep	ths:			n/a		
l3) Approximate C	oal Seam De	epths:		42, 281	, 577, 628, 1207,	1376	/
14) Approximate De	epth to Poss	ible Void (coal m	ine, karst, o	ther):	no	ne reported	
15) Does land conta	ain coal sear	ns tributary or a	djacent to, a	ctive mine?		no	
16) Describe propo	sed well wor	k: <u>Drill and</u>	complete a ne	w horizontal well. Ti	ne vertical drill to go do	own to approxima	tely depth of 7182'
tagging the Onond	aga not more th	nan 100' then plug ba	ack to approxim	ately 5646' and kicl	coff the horizontal leg	into the Genesed	using a
slick water frac.							
						···	
17) Describe fractu	ring/stimulati	ing methods in d	etail:		- · · · · · · · · · · · · · · · · · · ·		
Hydraulic fracturing is co	ompleted in acc	ordance with state r	egulations usin	g water recycled from	n previously fractured	wells and obtaine	d from
reshwater sources. Thi	is water is mixe	d with sand and a sr	nall percentage	(less than 0.3%) of	chemicals (including 1	5% Hydrochloric	acid,
gelling agent, gel break	er, friction redu	cer, biocide, and sca	ale inhibitor). St	age lengths vary from	m 150 to 450 feet. Ave	erage approximat	ely
100,000 gallons of wate	r per stage. Sa	nd sizes vary from 1	00 mesh to 20	40 mesh. Average	approximately 400,000	pounds of sand	per stage.
18) Total area to be	e disturbed, i	ncluding roads, s	stockpile are	a, pits, etc, (acre	es):	0 additi	onal
10) Area to be distu	irhed for well	I nad only less a	iccess road	(acres):		0 additional	

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CASING AND TUBING PROGRAM

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TYPE	Size	New	Grade	Weight per	FOOTAGE:	INTERVALS:	CEMENT:
		<u>or</u> <u>Used</u>		<u>ft.</u>	for Drilling	Left in Well	Fill- up (Cu.Ft.)
Conductor	20	New	MC-50	81#	72	72	69
Fresh Water	13 3/8	New	MC-50	54#	670'	670'	593
Coal		New		-	_	_	_
Intermediate	9 5/8	New	MC-50	40#	5327'	5327'	2,104
Production	5 1/2	New	P-110	20#	12,682	12,682	See Note 1
Tubing	2 3/8	-	J-55	4.6	_	-	May not be run, if run will be set 100' less than TD
iners							

ГҮРЕ	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20	24	0.635	_	Class A	1.18
-resh Water	13 3/8	17 1/2	0.38	2,480	1	1.21
Coal	_	_	<u> </u>	_	_	_
ntermediate	9 5/8	12 3/8	0.395	3,590	1	1.21
roduction	5 1/2	8 1/2	0.361	12,640	_	1.27/1.86
ubing						
iners						

Packers

O (N)	2013
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5	

ind:	N/A	
izes:	N/A	
epths Set:	N/A	

ote 1: EQT plans to bring the TOC on the production casing cement job 1,000' above kick off point so that the termediate casing shoe can be monitored during stimulation and the well can be safely plugged and abandoned in lefuture.

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21) Describe centralizer placement for each casing string.
• Surface: Bow spring centralizers - One at 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
22) 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:
<u>Lead (Type 1 Cement)</u> : 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.
0.3% CFR (dispersant). Makes cement easier to mix.
<u>Tail (Type H Cement)</u> : 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.
23) 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, continue 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

*Note: Attach additional sheets as needed.

the shakers every 15 minutes.

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Well 514654 (SMI28H14)

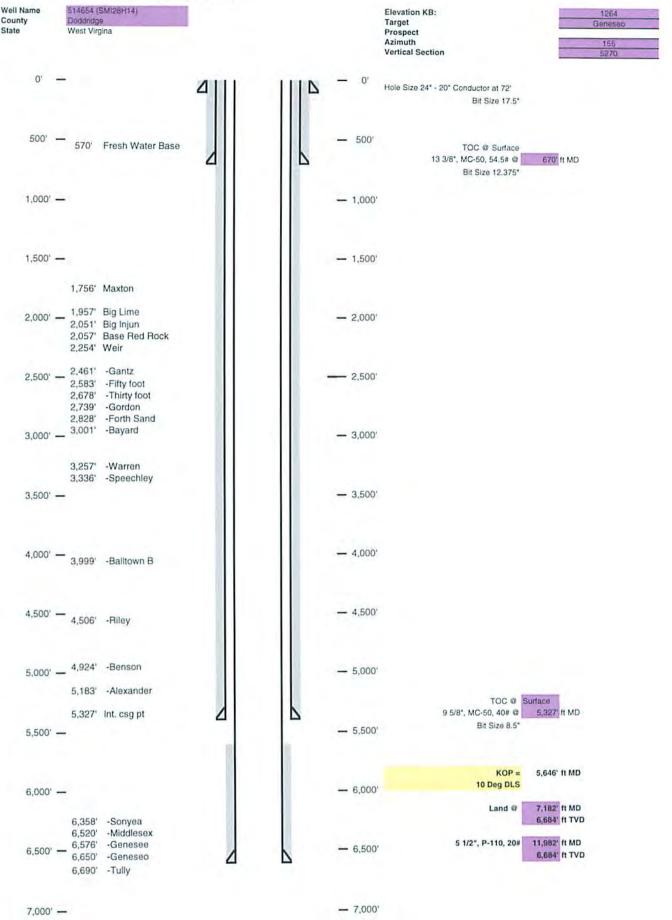
Azimuth #55

EQT Production

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3 MAY 1 Office of Oil and Gas WV Dept. of Environmental Protection

Well Schematic EQT Production



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