



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

December 17, 2013

EQT PRODUCTION COMPANY
POST OFFICE BOX 280
BRIDGEPORT, WV 26330

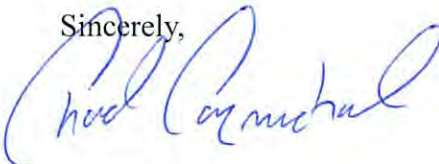
Re: Permit Modification Approval for API Number 10302733, Well #: 513924 EQT PRODUCTIVE
shorten length of intermediate casing

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,



for

Gene Smith
Regulatory/Compliance Manager
Office of Oil and Gas



Mod

December 3, 2013

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

Re: 47-103-02733 Modification

Dear Mr. Smith,

Attached are the corrected pages for the above modification. The intermediate casing was changed from 3375' to 2755' because of red rock issues. This change was approved by Derek Haught (see attached email) so that the rig could keep on working.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'Vicki Roark'.

Vicki Roark
Permitting Supervisor

Enc.

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CASING AND TUBING PROGRAM

20)

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: for Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu.Ft.)
Conductor	20	New	MC-50	81#	40	40	38
Fresh Water	13 3/8	New	MC-50	54#	845	845	739
Coal	—	New	—	—	—	—	—
Intermediate	9 5/8	New	MC-50	40#	2,755	2,755	1,080
Production	5 1/2	New	P-110	20#	10,987	10,987	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	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20	24	0.635	—	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						

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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 so that the intermediate casing shoe can be monitored during stimulation and the well can be safely plugged and abandoned in the future.

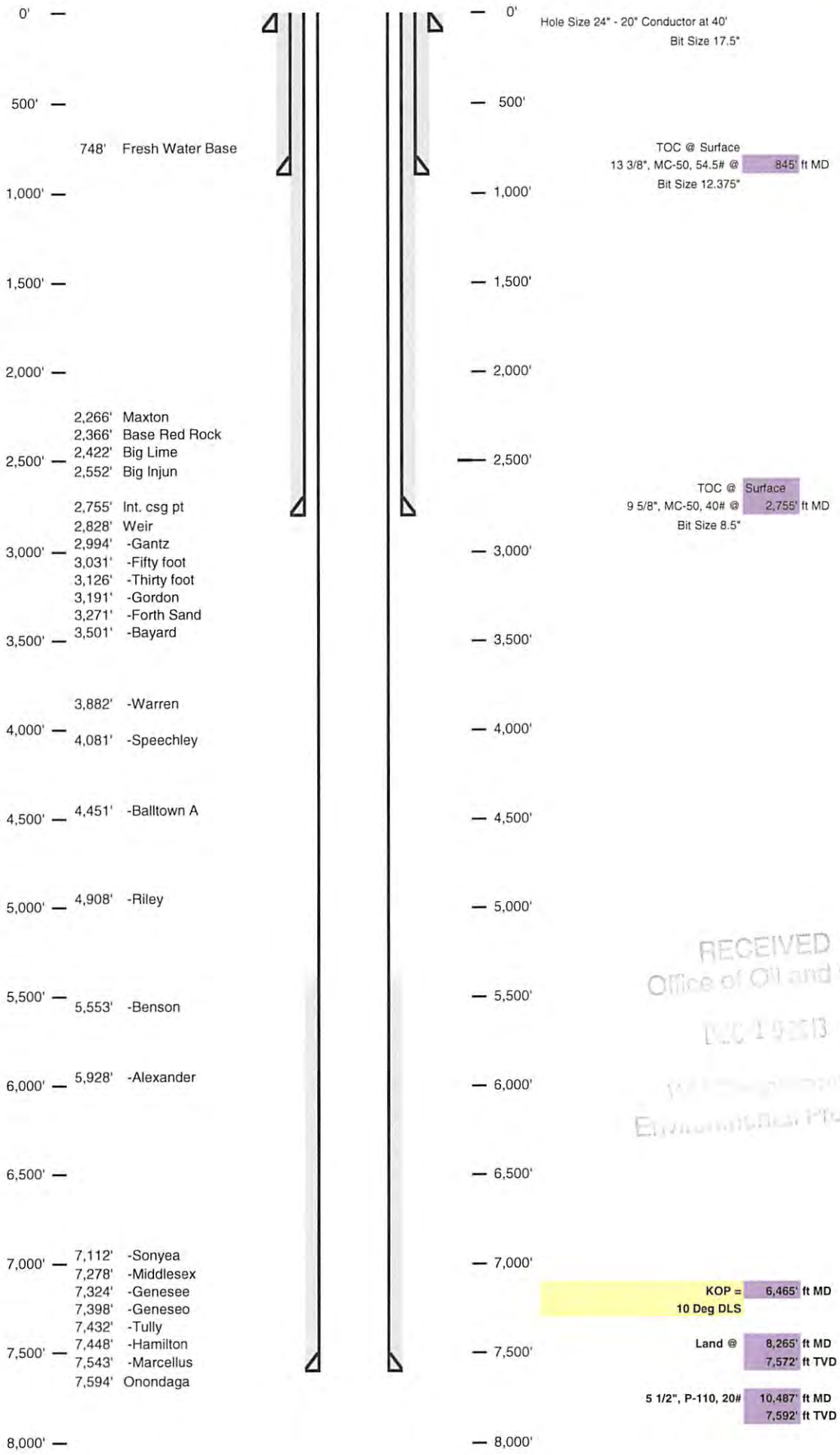
103-02733
Mod

Well Schematic
EQT Production

Well Name: 513930 (BIG190H14)
County: Wetzel
State: West Virginia

Elevation KB:
Target
Prospect
Azimuth
Vertical Section

1486
Marcellus
167
2644



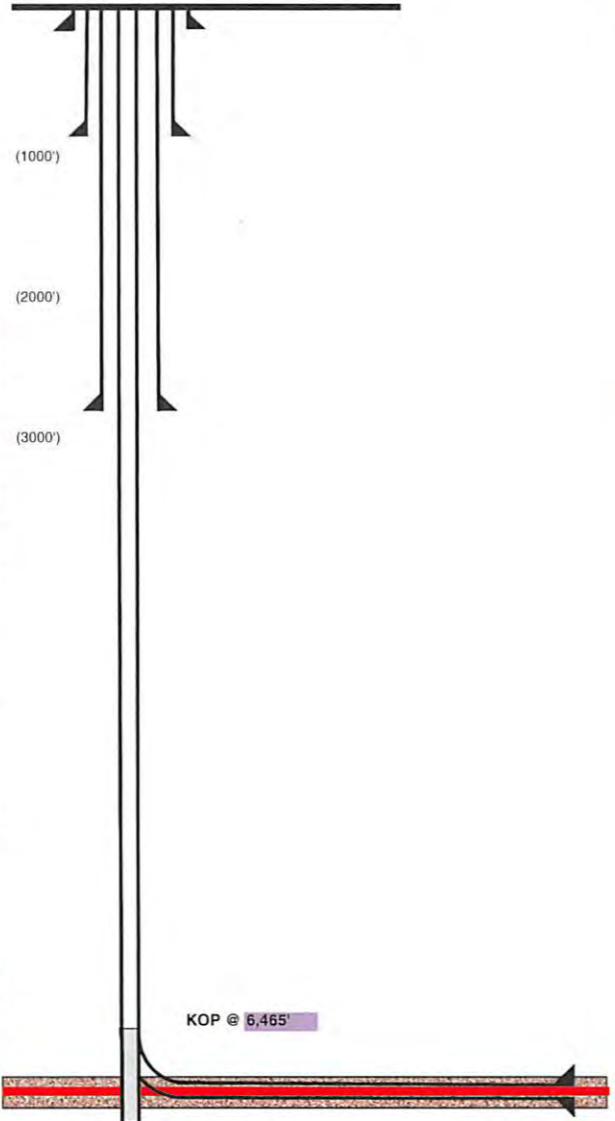
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103-02733
Mod

Well 513930 (BIG190H14)
EQT Production
Big Run
Wetzel West Virginia

Azimuth 167
Vertical Section 2644

TVD Depth (feet)	Formation Tops (TVD)
0'	
250'	
500'	
750'	Base Fresh Water 748
1,000'	
1,250'	
1,500'	
1,750'	
2,000'	
2,250'	Maxton 2266 - 2422
2,500'	Base Red Rock 2368
	Big Lime 2422 - 2552
	Big Lnjun 2552 - 2828
2,750'	Int. csg pt 2755
	Weir 2828 - 2994
3,000'	-Gantz 2994 - 3031
	-Fifty foot 3031 - 3126
3,250'	-Thirty foot 3126 - 3191
	-Gordon 3191 - 3271
3,500'	-Forth Sand 3271 - 3305
	-Bayard 3501 - 3534
3,750'	
4,000'	-Warren 3882 - 4081
	-Speechley 4081 - 4451
4,250'	
4,500'	-Balltown A 4451 - 4908
4,750'	
5,000'	-Riley 4908 - 5553
5,250'	
5,500'	
5,750'	-Benson 5553 - 5928
	-Alexander 5928 - 7112
6,000'	
6,250'	
6,500'	
6,750'	-Sonyea 7112 - 7132
	-Middlesex 7278 - 7324
7,000'	-Genesee 7324 - 7398
	-Genesee 7398 - 7432
7,250'	-Tully 7432 - 7448
	-Hamilton 7448 - 7543
7,500'	Marcellus top 7543
	Target Inside Marcellus 7572
7,750'	Marcellus Bottom 7594



Hole Size (inches)	Casing Type	Casing Size (inches)	Wt (ppf)/Grade
24	Conductor	20	
17 1/2	Surface	13 3/8	54#/MC-50
12 3/8	Intermediate	9 5/8	40#/MC-50
8 1/2	Production Casing	5 1/2	20#/P-110

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TD Pilot Hole @ 7615
100' below top of Onondaga
Run Logs, Plug back to KOP at 6465
Kick off for horizontal well in Marcellus

Land curve @ 7,572' ft TVD / 8,265' ft MD
Est. TD @ 7,582' ft TVD / 10,487' ft MD

2,221' ft Lateral

103-02733
Mod

Well Number: 513930 (BIG190H14)

Casing and Cementing		Deepest Fresh Water: 748'			
Type	Conductor	Mine Protection	Surface	Intermediate	Production
Hole Size, In.	24		17 1/2	12 3/8	8 1/2
Casing Size, OD In.	20	-	13 3/8	9 5/8	5 1/2
Casing Wall Thickness, In.	0.635	-	0.380	0.395	0.361
Depth, MD	40'	-	845'	2,755'	10,487'
Depth, TVD	40'	-	845'	2,755'	7,592'
Centralizers Used	Yes	-	Yes	Yes	Yes
Weight/Grade	81#/MC-50	-	54#/MC-50	40#/MC-50	20#/P-110
New or Used	New	-	New	New	New
Pressure Testing	-	-	20% Greater than exp. Pressure	20% Greater than exp. Pressure	20% greater than exp. fracture pressure
After Fracture Pressure Testing	-	-	-	-	20% greater than exp. shut pressure
ID, in	19.25	-	12.615	8.835	4.778
Burst (psi)	-	-	2,480	3,590	12,640
Collapse (psi)	-	-	1,110	2,470	11,100
Tension (mlbs)	-	-	455	456	587
Cement Class	-	-	-	-	H
Cement Type	Construction	-	1	1	-
Cement Yield	1.18	-	1.21	1.21	1.27/1.86
Meets API Standards	-	-	Yes	Yes	Yes
WOC Time	-	-	Min. 8 hrs	Min. 8 hrs	Min. 8 hrs
Top of Cement (Planned)	Surface	-	Surface	Surface	5,465'
Fill (ft.)	40'	-	845'	2,755'	5,022'
Percent Excess	-	-	20	20	10
Est. Volume (cu ft)	38	-	739	1,080	1,291
Est. Volume (BBLs)	7	-	132	192	230