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west virginia department of environmental protection

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Office of Oil and Gas  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304  
(304) 926-0450  
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Monday, November 2, 2020  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

SWN PRODUCTION COMPANY, LLC  
POST OFFICE BOX 12359  
SPRING, TX 773914954

Re: Permit Modification Approval for STATE OF WV DNR C BRK 8H  
47-009-00310-00-00

**Cement yield on Casing Plan Updated**

SWN PRODUCTION COMPANY, 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.

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

A handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned above the printed name and title.

James A. Martin  
Chief

Operator's Well Number: STATE OF WV DNR C BRK 10H  
Farm Name: STATE OF W.V. DNR  
U.S. WELL NUMBER: 47-009-00310-00-00  
Horizontal 6A New Drill  
Date Modification Issued: 11/02/2020

**Promoting a healthy environment.**

WW-6B  
(04/15)

API NO. 47-009 - 00310  
OPERATOR WELL NO. State of WV DNR C BRK 8H  
Well Pad Name: State of WV DNR C BRK

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

1) Well Operator: SWN Production Co., LLC 494512924 009-Brooke 4-Cross 620-Steubenville  
Operator ID County District Quadrangle

2) Operator's Well Number: State of WV DNR C BRK 8H Well Pad Name: State of WV DNR C BRK

3) Farm Name/Surface Owner: State of WV DNR Public Road Access: Putney Ridge Road

4) Elevation, current ground: 993' Elevation, proposed post-construction: 990'

5) Well Type (a) Gas  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_

(b) If Gas Shallow  Deep \_\_\_\_\_  
Horizontal \_\_\_\_\_

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s): 10-15-20  
Target Formation- Marcellus, Down-Dip Well to the South, Target Top TVD- 5872', Target Base TVD- 5934', Anticipated Thickness- 62', Associated Pressure- 3857

8) Proposed Total Vertical Depth: 5918'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 30,196

11) Proposed Horizontal Leg Length: 24,156.99'

12) Approximate Fresh Water Strata Depths: 371'

13) Method to Determine Fresh Water Depths: nearly water well.

14) Approximate Saltwater Depths: 575' salinity profile analysis

15) Approximate Coal Seam Depths: 6'

16) Approximate Depth to Possible Void (coal mine, karst, other): None that we are aware of

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes \_\_\_\_\_ No

(a) If Yes, provide Mine Info: Name: \_\_\_\_\_  
Depth: \_\_\_\_\_  
Seam: \_\_\_\_\_  
Owner: \_\_\_\_\_

*C. S. S. D.*

RECEIVED  
Office of Oil and Gas  
OCT 23 2020

WV Department of  
Environmental Protection

WW-6B  
(04/15)

API NO. 47-009 - 00310  
 OPERATOR WELL NO. State of WV DNR C BRK 6H  
 Well Pad Name: State of WV DNR C BRK

(8)

CASING AND TUBING PROGRAM

TYPE	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	20"	New	J-55	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	H-40	48#	421'	421'	415 sx/CTS
Coal	See	Conductor	Casing				
Intermediate	9 5/8"	New	J-55	36#	1380'	1380'	456 sx/CTS
Production	5 1/2"	New	P-110 HP	20#	30,196'	30,196'	inl 584sx/100' inside intermediate
Tubing							
Liners							

*C. T. SLO*  
10-15-20

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	30"	0.25	2120	81	Class A	1.20/30% Excess
Fresh Water	13 3/8"	17.5"	0.380	2730	633	Class A	1.20/30% Excess
Coal	See	Conductor	Casing				
Intermediate	9 5/8"	12 1/4"	0.352	3520	1768	Class A	1.19/40% Excess
Production	5 1/2"	8 3/4"-8 1/2"	0.361	14360	10500	Class A	1.19/5% Excess
Tubing							
Liners							

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Office of Oil and Gas

OCT 23 2020

PACKERS

WV Department of  
Environmental Protection

Kind:				
Sizes:				
Depths Set:				

84

October 19, 2020

Ms. Laura Adkins  
Office of Oil & Gas  
601 57<sup>th</sup> Street  
Charleston, WV 25304

**RE: Proposed Expedited Modification:** State of WV DNR C BRK 5H  
State of WV DNR C BRK 6H  
State of WV DNR C BRK 8H  
State of WV DNR C BRK 10H

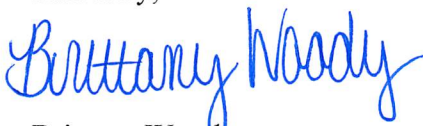
Dear Ms. Adkins

Enclosed please find a modification for the above captioned well. We made changes to the cement yield on page two of the 6B per the DEP inspector's request. This well is situated on the Edge's property, in Sand Hill District, Marshall County, West Virginia. Enclosed documents:  
-Updated 6B

If you have any questions or desire additional information, please me at 304-884-1613

Thank you.

Sincerely,



Brittany Woody  
Senior Regulatory Analyst  
Southwestern Energy Production Company, LLC

RECEIVED  
Office of Oil and Gas

OCT 23 2020

WV Department of  
Environmental Protection

CK# 1053070  
Amt \$ 5000  
Date 10/13/20

$\frac{R^2}{A} \rightarrow V^+$