



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
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Harold D. Ward, Cabinet Secretary
www.dep.wv.gov

Thursday, May 13, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

SWN PRODUCTION COMPANY, LLC
POST OFFICE BOX 12359

SPRING, TX 773914954

Re: Permit Modification Approval for GLADYS BRIGGS MSH 5H
47-051-02370-00-00

Modifications Approved: Cement Changes, Update Rig Information, Increase Intermediate Casing Depth

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.

James A. Martin
Chief

Operator's Well Number: GLADYS BRIGGS MSH 5H
Farm Name: GLADYS R. BRIGGS ESTATE
U.S. WELL NUMBER: 47-051-02370-00-00
Horizontal 6A New Drill
Date Modification Issued: May 17, 2021

Promoting a healthy environment.

05/21/2021

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 051-MARsh 4-Liberty 278-Cameron
Operator ID County District Quadrangle

2) Operator's Well Number: Gladys Briggs MSH 5H Well Pad Name: Gladys Briggs MSH pad

3) Farm Name/Surface Owner: Gladys R. Briggs Estate Public Road Access: Fish Creek Road

4) Elevation, current ground: 1383' Elevation, proposed post-construction: 1383'

5) Well Type (a) Gas Oil Underground Storage

Other

(b) If Gas Shallow Deep

Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Target Formation- Marcellus, Up-Dip well to the North, Target Top TVD- 7126', Target Base TVD- 7168', Anticipated Thickness- 42', Associated Pressure- 4659

8) Proposed Total Vertical Depth: 7153'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 20,504'

11) Proposed Horizontal Leg Length: 8882.82'

12) Approximate Fresh Water Strata Depths: 732'

13) Method to Determine Fresh Water Depths: Salinity Profile Analysis and offset water wells

14) Approximate Saltwater Depths: 1220' Salinity Profile

15) Approximate Coal Seam Depths: 1099'

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: Marshall County Coal Resources, Inc.

Depth: 1099'

Seam: Pittsburgh

Owner: American Consolidated Natural Resources

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18) 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# | 126' | 126' | CTS |
| Fresh Water | 13 3/8" | New | H-40 | 48# | 802' | 802' | 912 sx/CTS |
| Coal | See | Interm | Casing | | | | |
| Intermediate | 9 5/8" | New | J/K-55 | 36#/40# | 2700' | 2700' | 1068 sx/CTS |
| Production | 5 1/2" | New | P-110 HP | 20# | 20504' | 20504' | Tail 3705sx/ 100' inside Intermediate |
| Tubing | | | | | | | |
| Liners | | | | | | | |

Bryan Harris
4-21-21

| 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 | Interm | Casing | | | | |
| Intermediate | 9 5/8" | 12 1/4" | 0.395 | 3950 | 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 | | | | | | | |

PACKERS

| | | | | |
|-------------|--|--|--|--|
| Kind: | | | | |
| Sizes: | | | | |
| Depths Set: | | | | |

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Southwestern Energy Company

Proposed Drilling Program

Well: **GLADYS BRIGGS MSH 5**
 Field: **VICTORY FIELD WET**
 County: **MARSHALL**
 SHL: **39.7672** Latitude **-80.6158** Longitude
 BHL: **39.7974** Latitude **-80.6395** Longitude
 KB Elev: **1,409 ft MSL** KB: **26 ft AGL** GL Elev: **1,383 ft MSL**

Re-entry Rig: **SDC 41**
 Prospect: **Marcellus Shale**
 State: **WV**



No COAL VOID Anticipated

Gas Storage Interval : 1,991' - 2,492' (Maxton, Big Injun)

PROD TOC @ 2,800' MD

TUBULAR DETAIL

| Casing String | Casing Size (in) | Weight (Min) | Grade (Min) | Planned Interval | |
|---------------|------------------|------------------|-------------|------------------|---------------|
| | | | | From | To |
| Conductor | 20 | 94.0 # | J-55 | 0' | 126' |
| Surface | 13.375 | 48.0 # | H-40 | 0' | 802' |
| Intm/Coal | 9.625 | 36# / 40# | J/K-55 | 0' | 2,700' |
| Production | 5.5 | 20.0 # | P-110 HP | 0' | 20,504' |

CEMENT DETAIL

| | Sacks | Class | Density |
|---------------|-------------|-------|------------------|
| Conductor: | 151 | A | 19.3 |
| Surface: | 912 | A | 15.6 |
| Intermediate: | 1068 | A | 15.6-16.0 |
| Production: | 3705 | A | 14.5-15.6 |

126' to 822'
Air/Mist

822' to 1,800'
Air/Mist

1,800' to 2,720'
10.5# WBM

2,720' to 6,557'
Air/Mist

Air
TD at 6,557'

6,557' to 7,744'
12.0-12.2 ppg

7,744' to 20,504'
12.2-13.0 ppg

KOP at 6,557' MD

Freshwater Depth - 732' TVD
 Coal Depth - 1,099' TVD
 Saltwater Depth - 1,220' TVD
 TVD - 7,153'
 TMD - 20,504'

TD at 20,504' MD
7,105' TVD

7,153' Target Center

EOB at 7,744' MD

SHL Onondaga 7,168' TVD

Onondaga 7,120' TVD

Created by: Alex Pfeifer on 04/19/2021

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