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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)

Friday, November 2, 2018  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BLVD  
CANONSBURG, PA 15317

Re: Permit Modification Approval for BRYAN N-6HM  
47-051-01977-00-00

**Bottom hole extension with lease(s) updates**

TUG HILL OPERATING, 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 blue ink signature of James A. Martin, Chief. The signature is stylized and written in cursive. Below the signature, the name "James A. Martin" and the title "Chief" are printed in a standard black font.

James A. Martin  
Chief

Operator's Well Number: BRYAN N-6HM  
Farm Name: CNX LAND RESOURCES, INC.  
U.S. WELL NUMBER: 47-051-01977-00-00  
Horizontal 6A New Drill  
Date Modification Issued: 11/02/2018

Promoting a healthy environment.

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

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Franklin Powhatan Point  
Operator ID County District Quadrangle

2) Operator's Well Number: Bryan N-6HM Well Pad Name: Bryan

3) Farm Name/Surface Owner: CNX Land Resources, Inc. Public Road Access: Rines Ridge Rd

4) Elevation, current ground: 1191' Elevation, proposed post-construction: 1191'

5) Well Type (a) Gas  Oil  Underground Storage

Other

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No Yes

*8/15/18*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus is the target formation at a depth of 6463' - 6517', thickness of 54' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,596'

9) Formation at Total Vertical Depth: Onondoga

10) Proposed Total Measured Depth: 21,996' ✓

11) Proposed Horizontal Leg Length: 14,498.39'

12) Approximate Fresh Water Strata Depths: 803'

13) Method to Determine Fresh Water Depths: Offset well reports or noticeable flow at the flowline or when need to start soaping

14) Approximate Saltwater Depths: 2040'

15) Approximate Coal Seam Depths: Sewickly Coal - 701' and Pittsburgh Coal - 796'

16) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

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

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

Depth: \_\_\_\_\_

Seam: \_\_\_\_\_

Owner: \_\_\_\_\_

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    | 30"       | NEW         | BW    | BW                     | 100'                       | 100'                         | 216FT^3(CTS)                  |
| Fresh Water  | 13 3/8"   | NEW         | J55   | 54.5#                  | 903'                       | 903'                         | 919ft^3(CTS)                  |
| Coal         | 13 3/8"   | NEW         | J55   | 54.5#                  | 903'                       | 903'                         | 919ft^3(CTS)                  |
| Intermediate | 9 5/8"    | NEW         | J55   | 36#                    | 2,603'                     | 2,603'                       | 860ft^3(CTS)                  |
| Production   | 5 1/2"    | NEW         | P110  | 20#                    | 21,996' ✓                  | 21,996'                      | 5605ft^3(CTS)                 |
| Tubing       | 2 3/8"    | NEW         | N80   | 4.7#                   |                            | 7,022'                       |                               |
| Liners       | N/A       |             |       |                        |                            |                              |                               |

*ju*  
8/15/18

| 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    | 30"       | 36"                    | 1.0                 | 2,333                | 1,866                                    | CLASS A     | 1.2                      |
| Fresh Water  | 13 3/8"   | 17 1/2"                | .33                 | 2,740                | 2,192                                    | SEE #24     | 1.2                      |
| Coal         | 13 3/8"   | 17 1/2"                | .33                 | 2,740                | 2,192                                    | SEE#24      | 1.2                      |
| Intermediate | 9 5/8"    | 12 1/4"                | .352                | 3,520                | 2,816                                    | SEE#24      | 1.19                     |
| Production   | 5 1/2"    | 8 7/8_ 8 3/4           | .361                | 12,640               | 8,000                                    | SEE#24      | 1.17/1.19                |
| Tubing       | 2 3/8"    |                        | .19                 | 11,200               | 8,960                                    |             |                          |
| Liners       | N/A       |                        |                     |                      |  |             |                          |

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|             |     |  |  |
|-------------|-----|--|--|
| Kind:       | N/A |  |  |
| Sizes:      | N/A |  |  |
| Depths Set: | N/A |  |  |



*JL*  
*8/12/18*

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill through the Marcellus and TD Pilot Hole 100' into the Onondaga. Log vertical section and run a solid cement plug back to proposed KOP. Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Well to be completed with approximately 36,240,000 lb proppant and 560,297 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 16.14

22) Area to be disturbed for well pad only, less access road (acres): 5.98

23) Describe centralizer placement for each casing string:

Will run 3 centralizers on surface casing at equal distance. Intermediate will have 1 centralizer every other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

24) Describe all cement additives associated with each cement type:

\*See Attached

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25) Proposed borehole conditioning procedures:

Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow, POOH

\*Note: Attach additional sheets as needed.



**WELL NAME:** Bryan N-6HM  
**STATE:** West Virginia **COUNTY:** Marshall  
**DISTRICT:** Meade  
**DF Elev:** 1,191' **GL Elev:** 1,191'  
**TD:** 21,996'  
**TH Latitude:** 39.77571503  
**TH Longitude:** -80.77655671  
**BH Latitude:** 39.81378199  
**BH Longitude:** -80.79588299

| FORMATION TOPS      |           |
|---------------------|-----------|
| Formation           | Depth TVD |
| Deepest Fresh Water | 803       |
| Sewickley Coal      | 701       |
| Pittsburgh Coal     | 796       |
| Big Lime            | 1970      |
| Weir                | 2324      |
| Berea               | 2519      |
| Gordon              | 2864      |
| Rhinestreet         | 5857      |
| Genesee/Burkett     | 6347      |
| Tully               | 6382      |
| Hamilton            | 6417      |
| Marcellus           | 6463      |
| Landing Depth       | 6496      |
| Onondaga            | 6513      |
| Pilot Hole Depth    | 6596      |

| CASING SUMMARY |                |               |            |             |                |         |               |
|----------------|----------------|---------------|------------|-------------|----------------|---------|---------------|
| Type           | Hole Size (in) | Csg Size (in) | Depth (MD) | Depth (TVD) | Weight (lb/ft) | Grade   | Top of Cement |
| Conductor      | 36             | 30            | 100'       | 100'        | BW             | BW      | Surface       |
| Surface        | 17.5           | 13 3/8        | 903'       | 903'        | 54.5           | J55     | Surface       |
| Intermediate 1 | 12 1/4         | 9 5/8         | 2,603'     | 2,600'      | 36             | J55     | Surface       |
| Production     | 8 7/8 x 8 3/4  | 5 1/2         | 21,996'    | 6,243'      | 20             | CYHP110 | Surface       |

| CEMENT SUMMARY |       |       |         | DRILLING DETAILS |   |
|----------------|-------|-------|---------|------------------|---|
|                | Sacks | Class | Density | Fluid Type       | Centralizer Notes   |
| Conductor      | 291   | A     | 15.6    | Air              | None  |
| Surface        | 934   | A     | 15.6    | Air              | 3 Centralizers at equal distance  |
| Intermediate 1 | 848   | A     | 15      | Air              | 1 Centralizer every other jt  |
| Production     | 4,947 | A     | 14.5    | Air / SOBMM      | 1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc |



*Handwritten signature and date: 8/15/18*

Pilot Hole  
 PH TD @ 6,596' TVD  
 Landing Point @ 500' MD / 6,496' TVD  
 PH TVD = 100' below Onondaga Top

Lateral TD @ 21,996' ft MD  
 6,243' ft TVD

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**Tug Hill Operating, LLC Casing and Cement Program**

**Bryan N-6HM**

**Casing**

|              | String  | Grade   | Bit Size       | Depth (Measured) | Cement Fill Up |
|--------------|---------|---------|----------------|------------------|----------------|
| Conductor    | 30"     | BW      | 36"            | 100'             | CTS            |
| Surface      | 13 3/8" | J55     | 17 1/2"        | 903'             | CTS            |
| Intermediate | 9 5/8"  | J55     | 12 1/4"        | 2,603'           | CTS            |
| Production   | 5 1/2"  | CYHP110 | 8 7/8 x 8 3/4" | 21,996'          | CTS            |

**Cement**

Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19

Kick Off Plug: Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug

Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

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**Tug Hill Operating LLC**  
**Well: Bryan N-06HM (slot B)**  
**Site: Bryan Pad**  
**Project: Marshall County, WV**  
**Design: rev5**

**SECTION DETAILS**

| Sec | MD       | Inc   | Azi    | TVD     | +N/-S    | +E/-W    | Dleg  | TFace  | VSeet   | Annotation                      |
|-----|----------|-------|--------|---------|----------|----------|-------|--------|---------|---------------------------------|
| 1   | 0.00     | 0.00  | 0.00   | 0.00    | 0.00     | 0.00     | 0.00  | 0.00   | 0.00    |                                 |
| 2   | 1400.00  | 0.00  | 0.00   | 1400.00 | 0.00     | 0.00     | 0.00  | 0.00   | 0.00    | KOP Begin 2"/100' build         |
| 3   | 1600.00  | 4.00  | 71.23  | 1589.84 | 2.24     | 6.61     | 2.00  | 7°.28  | -0.34   | Begin 4.00' tangent             |
| 4   | 3204.07  | 4.00  | 71.23  | 3200.00 | 38.15    | 112.58   | 0.00  | 0.00   | -5.81   | Begin 2"/100' build/turn        |
| 5   | 5004.77  | 40.01 | 71.30  | 4842.15 | 251.00   | 741.23   | 2.00  | 0.02   | -38.45  | Begin 40.01' tangent            |
| 6   | 6521.51  | 40.01 | 71.30  | 6003.80 | 563.73   | 1664.96  | 0.00  | 0.00   | -85.43  | Begin 10"/100' build/turn       |
| 7   | 7500.24  | 91.00 | 330.21 | 6495.00 | 1288.97  | 1738.30  | 10.00 | -97.89 | 543.47  | Begin 91.00' lateral section    |
| 8   | 21995.89 | 91.00 | 330.21 | 6243.00 | 13848.28 | -5461.52 | 0.00  | 0.00   | 4886.38 | PBHL/TD 21995.89 MD/6243.00 TVD |



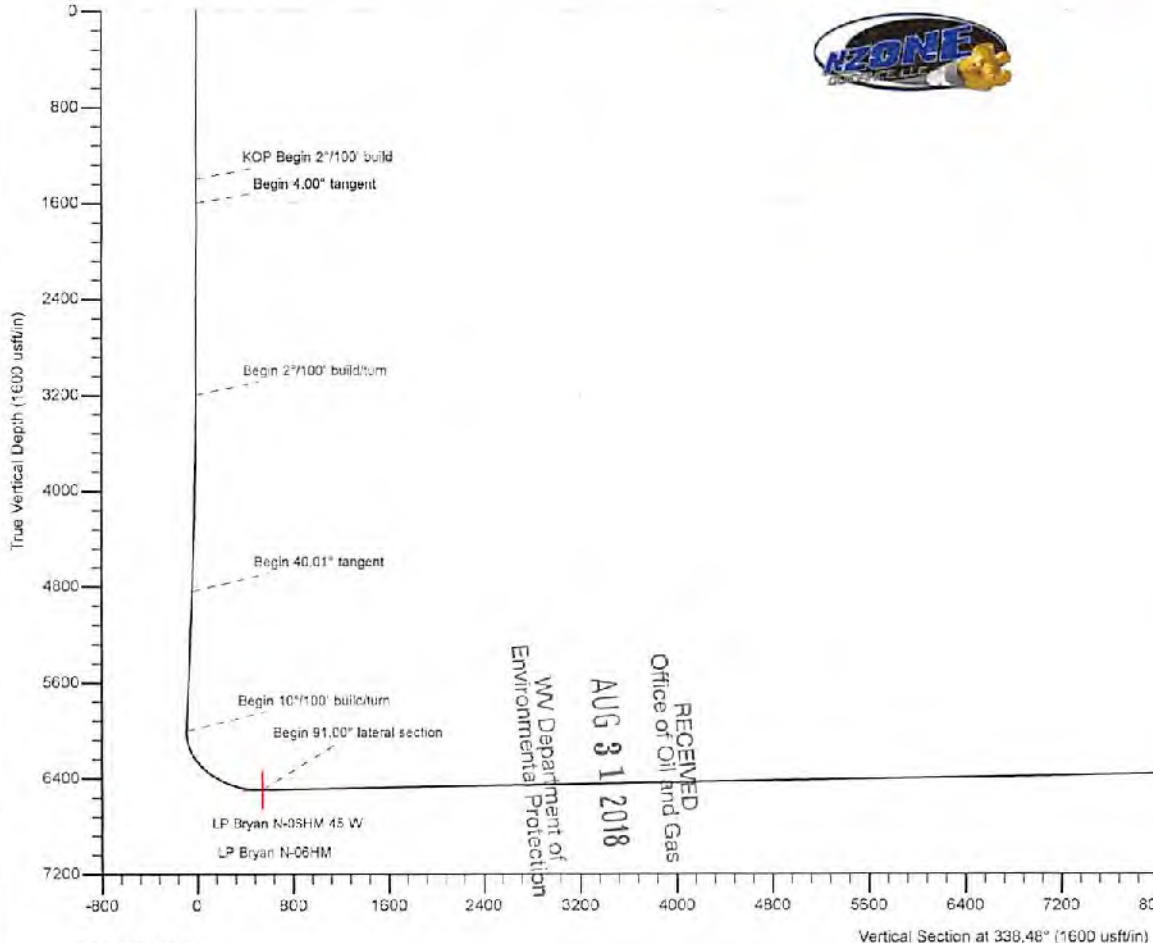
**Azimuths to Grid North**  
 True North: -0.14°  
 Magnetic North: -8.78°

**Magnetic Field**  
 Strength: 52156.8nT  
 Dip Angle: 66.94°  
 Date: 8/18/2017  
 Model: IGRF2015

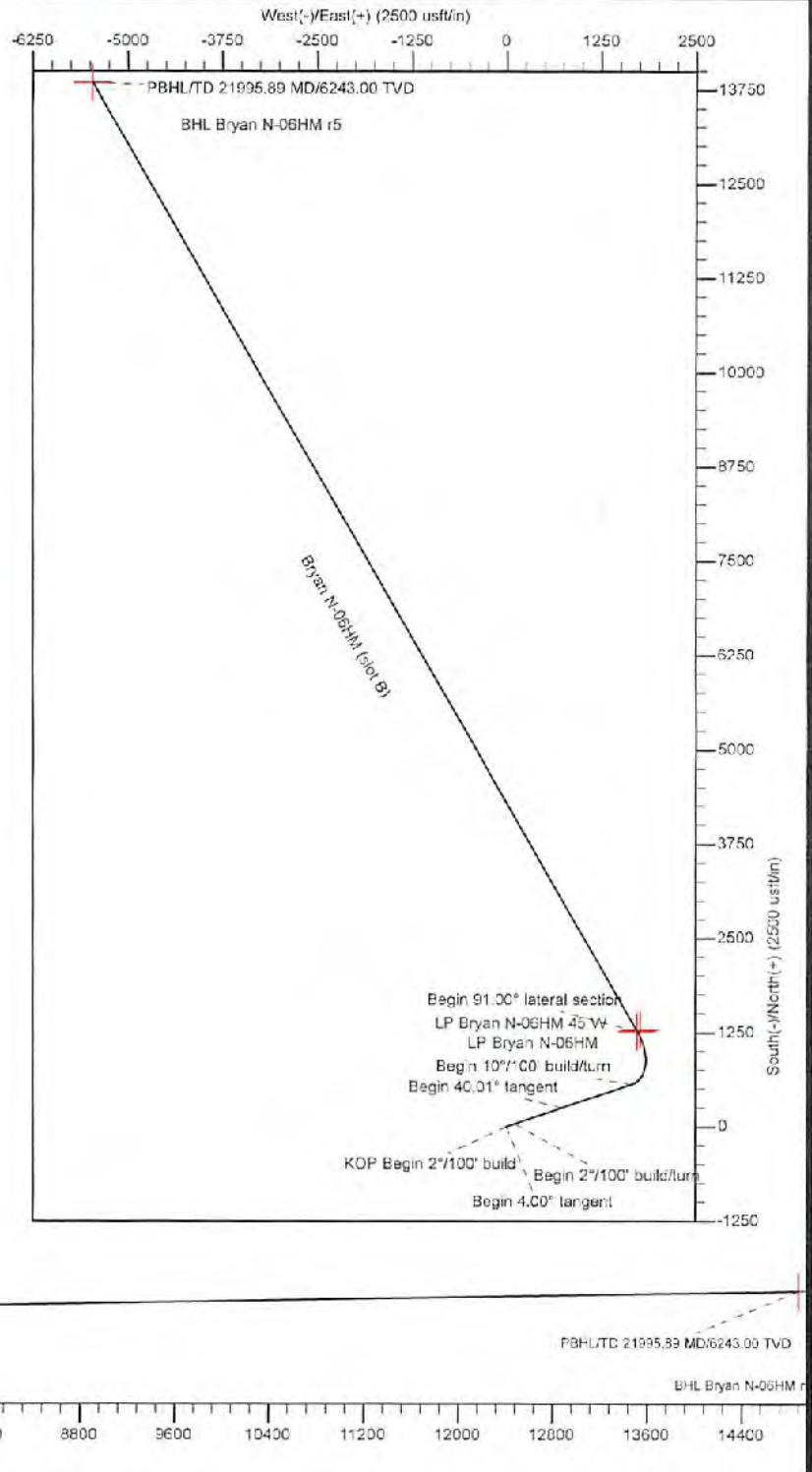
**Geodetic System: Universal Transverse Mercator (US Survey Feet)**  
 Datum: NAD83 West Virginia - HARN  
 Ellipsoid: GRS 1980  
 Zone: Zone 17N (84 W to 78 W)

**System Datum: Mean Sea Level**  
 Depth Reference: 31m1191 @ 1191.00ust  
 Surface location:  
 Northing Easting Latitude Longitude  
 14445142.16 1703195.45 39.77571503 -80.77655671

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.78°



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Planning Report - Geographic

|           |                                |                              |                            |
|-----------|--------------------------------|------------------------------|----------------------------|
| Database: | DB_Jul2216dt_v14               | Local Co-ordinate Reference: | Well Bryan N-06HM (slot B) |
| Company:  | Tug Hill Operating LLC         | TVD Reference:               | GL=1191 @ 1191.00usft      |
| Project:  | Marshall County, West Virginia | MD Reference:                | GL=1191 @ 1191.00usft      |
| Site:     | Bryan Pad                      | North Reference:             | Grid                       |
| Well:     | Bryan N-06HM (slot B)          | Survey Calculation Method:   | Minimum Curvature          |
| Wellbore: | Original Hole                  |                              |                            |
| Design:   | rev5                           |                              |                            |

|                    |  |                      |                |
|--------------------|--|----------------------|----------------|
| <b>Project</b>     | Marshall County, West Virginia                 |                      |                |
| <b>Map System:</b> | Universal Transverse Mercator (US Survey Feet) | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | NAD83 West Virginia - HARN                     |                      |                |
| <b>Map Zone:</b>   | Zone 17N (84 W to 78 W)                        |                      |                |

|                              |           |                     |                    |                          |              |
|------------------------------|-----------|---------------------|--------------------|--------------------------|--------------|
| <b>Site</b>                  | Bryan Pad |                     |                    |                          |              |
| <b>Site Position:</b>        |           | <b>Northing:</b>    | 14,445,110.80 usft | <b>Latitude:</b>         | 39.77562900  |
| <b>From:</b>                 | Lat/Long  | <b>Easting:</b>     | 1,703,181.57 usft  | <b>Longitude:</b>        | -80.77660992 |
| <b>Position Uncertainty:</b> | 0.00 usft | <b>Slot Radius:</b> | 13-3/16 "          | <b>Grid Convergence:</b> | 0.14 °       |

|                             |                       |           |                            |                    |                      |               |
|-----------------------------|-----------------------|-----------|----------------------------|--------------------|----------------------|---------------|
| <b>Well</b>                 | Bryan N-06HM (slot B) |           |                            |                    |                      |               |
| <b>Well Position</b>        | <b>+N/-S</b>          | 0.00 usft | <b>Northing:</b>           | 14,445,142.16 usft | <b>Latitude:</b>     | 39.77571503   |
|                             | <b>+E/-W</b>          | 0.00 usft | <b>Easting:</b>            | 1,703,196.45 usft  | <b>Longitude:</b>    | -80.77655671  |
| <b>Position Uncertainty</b> |                       | 0.00 usft | <b>Wellhead Elevation:</b> |                    | <b>Ground Level:</b> | 1,191.00 usft |

|                  |                   |                    |                    |                  |                       |
|------------------|-------------------|--------------------|--------------------|------------------|-----------------------|
| <b>Wellbore</b>  | Original Hole     |                    |                    |                  |                       |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination</b> | <b>Dip Angle</b> | <b>Field Strength</b> |
|                  | IGRF2015          | 8/18/2017          | (°)                | (°)              | (nT)                  |
|                  |                   |                    | -8.64              | 66.94            | 52,156.83164355       |

|                          |                         |              |                      |                  |
|--------------------------|-------------------------|--------------|----------------------|------------------|
| <b>Design</b>            | rev5                    |              |                      |                  |
| <b>Audit Notes:</b>      |                         |              |                      |                  |
| <b>Version:</b>          | <b>Phase:</b>           | PLAN         | <b>Tie On Depth:</b> | 0.00             |
| <b>Vertical Section:</b> | <b>Depth From (TVD)</b> | <b>+N/-S</b> | <b>+E/-W</b>         | <b>Direction</b> |
|                          | (usft)                  | (usft)       | (usft)               | (°)              |
|                          | 0.00                    | 0.00         | 0.00                 | 338.48           |

|                                 |                 |                                |                  |                |  |
|---------------------------------|-----------------|--------------------------------|------------------|----------------|--|
| <b>Plan Survey Tool Program</b> | <b>Date</b>     | 4/24/2018                      |                  |                | RECEIVED<br>Office of Oil and Gas            |
| <b>Depth From</b>               | <b>Depth To</b> | <b>Survey (Wellbore)</b>       | <b>Tool Name</b> | <b>Remarks</b> | AUG 31 2018                                  |
| (usft)                          | (usft)          |                                |                  |                | WV Department of<br>Environmental Protection |
| 1                               | 0.00            | 21,995.89 rev5 (Original Hole) | MWD              |                |  |
|                                 |                 |                                | MWD - Standard   |                |  |

| <b>Plan Sections</b>  |                 |             |                       |              |              |                         |                        |                       |         |                    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|------------------------|-----------------------|---------|--------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | TFO (°) | Target             |
| 0.00                  | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                   | 0.00                  | 0.00    |                    |
| 1,400.00              | 0.00            | 0.00        | 1,400.00              | 0.00         | 0.00         | 0.00                    | 0.00                   | 0.00                  | 0.00    |                    |
| 1,600.00              | 4.00            | 71.28       | 1,599.84              | 2.24         | 6.61         | 2.00                    | 2.00                   | 0.00                  | 71.28   |                    |
| 3,204.07              | 4.00            | 71.28       | 3,200.00              | 38.15        | 112.58       | 0.00                    | 0.00                   | 0.00                  | 0.00    |                    |
| 5,004.77              | 40.01           | 71.30       | 4,642.15              | 251.00       | 741.23       | 2.00                    | 2.00                   | 0.00                  | 0.02    |                    |
| 6,521.51              | 40.01           | 71.30       | 6,003.80              | 563.73       | 1,664.96     | 0.00                    | 0.00                   | 0.00                  | 0.00    |                    |
| 7,500.24              | 91.00           | 330.21      | 6,496.00              | 1,269.97     | 1,738.80     | 10.00                   | 5.21                   | -10.33                | -97.89  | LP Bryan N-06HM 45 |
| 21,995.89             | 91.00           | 330.21      | 6,243.00              | 13,848.28    | -5,461.62    | 0.00                    | 0.00                   | 0.00                  | 0.00    | BHL Bryan N-06HM r |





Planning Report - Geographic

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia  
 Site: Bryan Pad  
 Well: Bryan N-06HM (slot B)  
 Wellbore: Original Hole  
 Design: rev5

Local Co-ordinate Reference: Well Bryan N-06HM (slot B)  
 TVD Reference: GL=1191 @ 1191.00usft  
 MD Reference: GL=1191 @ 1191.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

| Measured Depth (usft)           | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|---------------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 0.00                            | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 100.00                          | 0.00            | 0.00        | 100.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 200.00                          | 0.00            | 0.00        | 200.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 300.00                          | 0.00            | 0.00        | 300.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 400.00                          | 0.00            | 0.00        | 400.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 500.00                          | 0.00            | 0.00        | 500.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 600.00                          | 0.00            | 0.00        | 600.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 700.00                          | 0.00            | 0.00        | 700.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 800.00                          | 0.00            | 0.00        | 800.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 900.00                          | 0.00            | 0.00        | 900.00                | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 1,000.00                        | 0.00            | 0.00        | 1,000.00              | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 1,100.00                        | 0.00            | 0.00        | 1,100.00              | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 1,200.00                        | 0.00            | 0.00        | 1,200.00              | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 1,300.00                        | 0.00            | 0.00        | 1,300.00              | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| 1,400.00                        | 0.00            | 0.00        | 1,400.00              | 0.00         | 0.00         | 14,445,142.16       | 1,703,196.45       | 39.77571503 | -80.77655671 |
| <b>KOP Begin 2°/100' build</b>  |                 |             |                       |              |              |                     |                    |             |              |
| 1,500.00                        | 2.00            | 71.28       | 1,499.98              | 0.56         | 1.65         | 14,445,142.72       | 1,703,198.10       | 39.77571656 | -80.77655082 |
| 1,600.00                        | 4.00            | 71.28       | 1,599.84              | 2.24         | 6.61         | 14,445,144.40       | 1,703,203.06       | 39.77572114 | -80.77653317 |
| <b>Begin 4.00° tangent</b>      |                 |             |                       |              |              |                     |                    |             |              |
| 1,700.00                        | 4.00            | 71.28       | 1,699.59              | 4.48         | 13.22        | 14,445,146.64       | 1,703,209.66       | 39.77572724 | -80.77650963 |
| 1,800.00                        | 4.00            | 71.28       | 1,799.35              | 6.72         | 19.32        | 14,445,148.88       | 1,703,216.27       | 39.77573334 | -80.77648610 |
| 1,900.00                        | 4.00            | 71.28       | 1,899.10              | 8.96         | 26.43        | 14,445,151.12       | 1,703,222.88       | 39.77573945 | -80.77646257 |
| 2,000.00                        | 4.00            | 71.28       | 1,998.86              | 11.19        | 33.04        | 14,445,153.36       | 1,703,229.48       | 39.77574555 | -80.77643903 |
| 2,100.00                        | 4.00            | 71.28       | 2,098.62              | 13.43        | 39.64        | 14,445,155.59       | 1,703,236.09       | 39.77575165 | -80.77641550 |
| 2,200.00                        | 4.00            | 71.28       | 2,198.37              | 15.67        | 46.25        | 14,445,157.83       | 1,703,242.70       | 39.77575776 | -80.77639197 |
| 2,300.00                        | 4.00            | 71.28       | 2,298.13              | 17.91        | 52.86        | 14,445,160.07       | 1,703,249.30       | 39.77576386 | -80.77636843 |
| 2,400.00                        | 4.00            | 71.28       | 2,397.88              | 20.15        | 59.46        | 14,445,162.31       | 1,703,255.91       | 39.77576996 | -80.77634490 |
| 2,500.00                        | 4.00            | 71.28       | 2,497.64              | 22.39        | 66.07        | 14,445,164.55       | 1,703,262.52       | 39.77577606 | -80.77632136 |
| 2,599.99                        | 4.00            | 71.28       | 2,597.40              | 24.63        | 72.68        | 14,445,166.79       | 1,703,269.12       | 39.77578217 | -80.77629783 |
| 2,699.99                        | 4.00            | 71.28       | 2,697.15              | 26.87        | 79.28        | 14,445,169.03       | 1,703,275.73       | 39.77578827 | -80.77627430 |
| 2,799.99                        | 4.00            | 71.28       | 2,796.91              | 29.11        | 85.89        | 14,445,171.27       | 1,703,282.34       | 39.77579437 | -80.77625076 |
| 2,899.99                        | 4.00            | 71.28       | 2,896.67              | 31.34        | 92.50        | 14,445,173.50       | 1,703,288.94       | 39.77580048 | -80.77622723 |
| 2,999.99                        | 4.00            | 71.28       | 2,996.42              | 33.58        | 99.10        | 14,445,175.74       | 1,703,295.55       | 39.77580658 | -80.77620370 |
| 3,099.99                        | 4.00            | 71.28       | 3,096.18              | 35.82        | 105.71       | 14,445,177.98       | 1,703,302.16       | 39.77581268 | -80.77618016 |
| 3,199.99                        | 4.00            | 71.28       | 3,195.93              | 38.06        | 112.31       | 14,445,180.22       | 1,703,308.76       | 39.77581879 | -80.77615663 |
| 3,204.07                        | 4.00            | 71.28       | 3,200.00              | 38.15        | 112.58       | 14,445,180.31       | 1,703,309.03       | 39.77581903 | -80.77615567 |
| <b>Begin 2°/100' build/turn</b> |                 |             |                       |              |              |                     |                    |             |              |
| 3,299.99                        | 5.92            | 71.29       | 3,295.56              | 40.81        | 120.44       | 14,445,182.97       | 1,703,316.88       | 39.77582629 | -80.77612769 |
| 3,399.99                        | 7.92            | 71.29       | 3,394.83              | 44.68        | 131.85       | 14,445,186.84       | 1,703,328.29       | 39.77583662 | -80.77608706 |
| 3,499.99                        | 9.92            | 71.29       | 3,493.81              | 49.65        | 146.53       | 14,445,191.81       | 1,703,342.98       | 39.77585038 | -80.77603475 |
| 3,599.99                        | 11.92           | 71.29       | 3,591.80              | 55.72        | 164.47       | 14,445,197.88       | 1,703,360.91       | 39.77586694 | -80.77597085 |
| 3,699.99                        | 13.92           | 71.29       | 3,689.26              | 62.89        | 185.64       | 14,445,205.06       | 1,703,382.09       | 39.77588648 | -80.77589542 |
| 3,799.99                        | 15.92           | 71.29       | 3,785.89              | 71.15        | 210.03       | 14,445,213.31       | 1,703,406.47       | 39.77590899 | -80.77580857 |
| 3,899.99                        | 17.92           | 71.29       | 3,881.55              | 80.48        | 237.59       | 14,445,222.64       | 1,703,434.03       | 39.77593443 | -80.77571039 |
| 3,999.99                        | 19.92           | 71.29       | 3,976.15              | 90.88        | 268.30       | 14,445,233.04       | 1,703,464.74       | 39.77596277 | -80.77560100 |
| 4,099.99                        | 21.92           | 71.29       | 4,069.55              | 102.33       | 302.11       | 14,445,244.49       | 1,703,498.56       | 39.77599399 | -80.77548054 |
| 4,199.99                        | 23.92           | 71.30       | 4,161.65              | 114.82       | 339.00       | 14,445,256.98       | 1,703,535.44       | 39.77602803 | -80.77534916 |
| 4,299.99                        | 25.92           | 71.30       | 4,252.34              | 128.33       | 378.90       | 14,445,270.49       | 1,703,575.35       | 39.77606486 | -80.77520701 |
| 4,399.99                        | 27.92           | 71.30       | 4,341.50              | 142.85       | 421.78       | 14,445,285.01       | 1,703,618.23       | 39.77610443 | -80.77505426 |
| 4,499.99                        | 29.92           | 71.30       | 4,429.02              | 158.35       | 467.58       | 14,445,300.51       | 1,703,664.03       | 39.77614670 | -80.77489112 |
| 4,599.99                        | 31.92           | 71.30       | 4,514.81              | 174.83       | 516.25       | 14,445,316.99       | 1,703,712.69       | 39.77619161 | -80.77471776 |
| 4,699.99                        | 33.92           | 71.30       | 4,598.75              | 192.26       | 567.72       | 14,445,334.42       | 1,703,764.16       | 39.77623911 | -80.77453441 |
| 4,799.99                        | 35.92           | 71.30       | 4,680.74              | 210.61       | 621.93       | 14,445,352.77       | 1,703,818.38       | 39.77628915 | -80.77434128 |
| 4,899.99                        | 37.92           | 71.30       | 4,760.69              | 229.87       | 678.82       | 14,445,372.03       | 1,703,875.27       | 39.77634165 | -80.77413862 |





Planning Report - Geographic

|           |                                |                              |                            |
|-----------|--------------------------------|------------------------------|----------------------------|
| Database: | DB_Jul2216dt_v14               | Local Co-ordinate Reference: | Well Bryan N-06HM (slot B) |
| Company:  | Tug Hill Operating LLC         | TVD Reference:               | GL=1191 @ 1191.00usft      |
| Project:  | Marshall County, West Virginia | MD Reference:                | GL=1191 @ 1191.00usft      |
| Site:     | Bryan Pad                      | North Reference:             | Grid                       |
| Well:     | Bryan N-06HM (slot B)          | Survey Calculation Method:   | Minimum Curvature          |
| Wellbore: | Original Hole                  |                              |                            |
| Design:   | rev5                           |                              |                            |

| Planned Survey                      |                 |             |                       |              |              |                     |                    |             |              |  |
|-------------------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft)               | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |  |
| 4,999.99                            | 39.92           | 71.30       | 4,838.49              | 250.02       | 738.32       | 14,445,392.18       | 1,703,934.77       | 39.77639658 | -80.77392867 |  |
| 5,004.77                            | 40.01           | 71.30       | 4,842.15              | 251.00       | 741.23       | 14,445,393.16       | 1,703,937.68       | 39.77639924 | -80.77391631 |  |
| <b>Begin 40.01° tangent</b>         |                 |             |                       |              |              |                     |                    |             |              |  |
| 5,099.99                            | 40.01           | 71.30       | 4,915.08              | 270.63       | 789.22       | 14,445,412.79       | 1,703,995.67       | 39.77645278 | -80.77370973 |  |
| 5,199.99                            | 40.01           | 71.30       | 4,991.67              | 291.25       | 860.13       | 14,445,433.41       | 1,704,056.57       | 39.77650899 | -80.77349279 |  |
| 5,299.99                            | 40.01           | 71.30       | 5,068.25              | 311.87       | 921.03       | 14,445,454.03       | 1,704,117.47       | 39.77656516 | -80.77327584 |  |
| 5,399.99                            | 40.01           | 71.30       | 5,144.84              | 332.49       | 981.93       | 14,445,474.65       | 1,704,178.38       | 39.77662135 | -80.77305890 |  |
| 5,499.99                            | 40.01           | 71.30       | 5,221.43              | 353.11       | 1,042.83     | 14,445,495.27       | 1,704,239.28       | 39.77667756 | -80.77284195 |  |
| 5,599.99                            | 40.01           | 71.30       | 5,298.02              | 373.73       | 1,103.73     | 14,445,515.89       | 1,704,300.18       | 39.77673376 | -80.77262500 |  |
| 5,699.99                            | 40.01           | 71.30       | 5,374.61              | 394.34       | 1,164.63     | 14,445,536.50       | 1,704,361.08       | 39.77678995 | -80.77240805 |  |
| 5,799.99                            | 40.01           | 71.30       | 5,451.20              | 414.96       | 1,225.54     | 14,445,557.12       | 1,704,421.98       | 39.77684615 | -80.77219111 |  |
| 5,899.99                            | 40.01           | 71.30       | 5,527.79              | 435.58       | 1,286.44     | 14,445,577.74       | 1,704,482.88       | 39.77690235 | -80.77197416 |  |
| 5,999.99                            | 40.01           | 71.30       | 5,604.38              | 456.20       | 1,347.34     | 14,445,598.36       | 1,704,543.79       | 39.77695855 | -80.77175721 |  |
| 6,099.99                            | 40.01           | 71.30       | 5,680.96              | 476.82       | 1,408.24     | 14,445,618.98       | 1,704,604.69       | 39.77701475 | -80.77154026 |  |
| 6,199.99                            | 40.01           | 71.30       | 5,757.55              | 497.44       | 1,469.14     | 14,445,639.60       | 1,704,665.59       | 39.77707094 | -80.77132331 |  |
| 6,299.99                            | 40.01           | 71.30       | 5,834.14              | 518.05       | 1,530.04     | 14,445,660.21       | 1,704,726.49       | 39.77712714 | -80.77110636 |  |
| 6,399.99                            | 40.01           | 71.30       | 5,910.73              | 538.67       | 1,590.95     | 14,445,680.83       | 1,704,787.39       | 39.77718333 | -80.77088941 |  |
| 6,499.99                            | 40.01           | 71.30       | 5,987.32              | 559.29       | 1,651.85     | 14,445,701.45       | 1,704,848.30       | 39.77723953 | -80.77067246 |  |
| 6,521.51                            | 40.01           | 71.30       | 6,003.80              | 563.73       | 1,684.96     | 14,445,705.89       | 1,704,861.40       | 39.77725163 | -80.77062577 |  |
| <b>Begin 10°/100' build/turn</b>    |                 |             |                       |              |              |                     |                    |             |              |  |
| 6,599.99                            | 39.58           | 59.04       | 6,064.19              | 584.71       | 1,710.36     | 14,445,726.87       | 1,704,906.81       | 39.77730893 | -80.77046397 |  |
| 6,699.99                            | 40.88           | 43.66       | 6,140.73              | 624.88       | 1,760.40     | 14,445,767.04       | 1,704,956.84       | 39.77741888 | -80.77028552 |  |
| 6,799.99                            | 44.07           | 29.60       | 6,214.64              | 678.93       | 1,800.27     | 14,445,821.09       | 1,704,996.72       | 39.77756704 | -80.77014311 |  |
| 6,899.99                            | 48.78           | 17.40       | 6,283.69              | 745.22       | 1,828.77     | 14,445,887.39       | 1,705,025.21       | 39.77774891 | -80.77004108 |  |
| 6,999.99                            | 54.59           | 7.00        | 6,345.77              | 821.75       | 1,845.02     | 14,445,963.92       | 1,705,041.47       | 39.77795897 | -80.76998252 |  |
| 7,099.99                            | 61.16           | 358.09      | 6,398.99              | 906.19       | 1,848.54     | 14,446,048.35       | 1,705,044.99       | 39.77819083 | -80.76996922 |  |
| 7,199.99                            | 68.25           | 350.28      | 6,441.74              | 995.97       | 1,839.22     | 14,446,138.13       | 1,705,035.67       | 39.77843745 | -80.77000157 |  |
| 7,299.99                            | 75.67           | 343.22      | 6,472.73              | 1,088.36     | 1,817.34     | 14,446,230.52       | 1,705,013.79       | 39.77869133 | -80.77007860 |  |
| 7,399.99                            | 83.28           | 336.62      | 6,491.00              | 1,180.55     | 1,783.57     | 14,446,322.71       | 1,704,980.01       | 39.77894478 | -80.77019797 |  |
| 7,499.99                            | 90.98           | 330.23      | 6,496.00              | 1,269.75     | 1,738.93     | 14,446,411.91       | 1,704,935.37       | 39.77919005 | -80.77035605 |  |
| 7,500.24                            | 91.00           | 330.21      | 6,496.00              | 1,269.97     | 1,738.80     | 14,446,412.14       | 1,704,935.25       | 39.77919065 | -80.77035650 |  |
| <b>Begin 91.00° lateral section</b> |                 |             |                       |              |              |                     |                    |             |              |  |
| 7,599.98                            | 91.00           | 330.21      | 6,494.28              | 1,356.53     | 1,689.25     | 14,446,498.69       | 1,704,885.70       | 39.77942870 | -80.77053206 |  |
| 7,699.98                            | 91.00           | 330.21      | 6,492.51              | 1,443.30     | 1,639.58     | 14,446,585.46       | 1,704,836.03       | 39.77968735 | -80.77070807 |  |
| 7,799.98                            | 91.00           | 330.21      | 6,490.77              | 1,530.07     | 1,589.91     | 14,446,672.23       | 1,704,786.35       | 39.77990500 | -80.77088408 |  |
| 7,899.98                            | 91.00           | 330.21      | 6,489.02              | 1,616.84     | 1,540.24     | 14,446,759.01       | 1,704,736.68       | 39.78014465 | -80.77106010 |  |
| 7,999.98                            | 91.00           | 330.21      | 6,487.28              | 1,703.62     | 1,490.56     | 14,446,845.78       | 1,704,687.01       | 39.78038330 | -80.77123611 |  |
| 8,099.98                            | 91.00           | 330.21      | 6,485.53              | 1,790.39     | 1,440.89     | 14,446,932.55       | 1,704,637.34       | 39.78062195 | -80.77141213 |  |
| 8,199.98                            | 91.00           | 330.21      | 6,483.79              | 1,877.16     | 1,391.22     | 14,447,019.32       | 1,704,587.66       | 39.78086060 | -80.77158814 |  |
| 8,299.98                            | 91.00           | 330.21      | 6,482.04              | 1,963.94     | 1,341.54     | 14,447,106.10       | 1,704,537.99       | 39.78109925 | -80.77176416 |  |
| 8,399.98                            | 91.00           | 330.21      | 6,480.30              | 2,050.71     | 1,291.87     | 14,447,192.87       | 1,704,488.32       | 39.78133790 | -80.77194018 |  |
| 8,499.98                            | 91.00           | 330.21      | 6,478.55              | 2,137.48     | 1,242.20     | 14,447,279.64       | 1,704,438.64       | 39.78157855 | -80.77211620 |  |
| 8,599.98                            | 91.00           | 330.21      | 6,476.81              | 2,224.25     | 1,192.52     | 14,447,366.41       | 1,704,388.97       | 39.78181520 | -80.77229223 |  |
| 8,699.98                            | 91.00           | 330.21      | 6,475.06              | 2,311.03     | 1,142.85     | 14,447,453.19       | 1,704,339.30       | 39.78205385 | -80.77246825 |  |
| 8,799.98                            | 91.00           | 330.21      | 6,473.32              | 2,397.80     | 1,093.18     | 14,447,539.96       | 1,704,289.63       | 39.78229250 | -80.77264427 |  |
| 8,899.98                            | 91.00           | 330.21      | 6,471.57              | 2,484.57     | 1,043.51     | 14,447,626.73       | 1,704,239.95       | 39.78253115 | -80.77282030 |  |
| 8,999.98                            | 91.00           | 330.21      | 6,469.82              | 2,571.35     | 993.83       | 14,447,713.51       | 1,704,190.28       | 39.78276979 | -80.77299633 |  |
| 9,099.98                            | 91.00           | 330.21      | 6,468.08              | 2,658.12     | 944.16       | 14,447,800.28       | 1,704,140.61       | 39.78300844 | -80.77317235 |  |
| 9,199.98                            | 91.00           | 330.21      | 6,466.33              | 2,744.89     | 894.49       | 14,447,887.05       | 1,704,090.93       | 39.78324709 | -80.77334838 |  |
| 9,299.98                            | 91.00           | 330.21      | 6,464.59              | 2,831.66     | 844.81       | 14,447,973.82       | 1,704,041.26       | 39.78348574 | -80.77352441 |  |
| 9,399.98                            | 91.00           | 330.21      | 6,462.84              | 2,918.44     | 795.14       | 14,448,060.60       | 1,703,991.59       | 39.78372438 | -80.77370044 |  |
| 9,499.98                            | 91.00           | 330.21      | 6,461.10              | 3,005.21     | 745.47       | 14,448,147.37       | 1,703,941.92       | 39.78396303 | -80.77387648 |  |
| 9,599.98                            | 91.00           | 330.21      | 6,459.35              | 3,091.98     | 695.80       | 14,448,234.14       | 1,703,892.24       | 39.78420168 | -80.77405251 |  |
| 9,699.98                            | 91.00           | 330.21      | 6,457.61              | 3,178.75     | 646.12       | 14,448,320.92       | 1,703,842.57       | 39.78444032 | -80.77422855 |  |





Planning Report - Geographic

|           |                                |                              |                            |
|-----------|--------------------------------|------------------------------|----------------------------|
| Database: | DB_Jul2216dt_v14               | Local Co-ordinate Reference: | Well Bryan N-06HM (slot B) |
| Company:  | Tug Hill Operating LLC         | TVD Reference:               | GL=1191 @ 1191.00usft      |
| Project:  | Marshall County, West Virginia | MD Reference:                | GL=1191 @ 1191.00usft      |
| Site:     | Bryan Pad                      | North Reference:             | Grid                       |
| Well:     | Bryan N-06HM (slot B)          | Survey Calculation Method:   | Minimum Curvature          |
| Wellbore: | Original Hole                  |                              |                            |
| Design:   | rev5                           |                              |                            |

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Office of Oil and Gas  
AUG 31 2018

Planned Survey

WV Dept  
Environmental Protection

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 9,799.98              | 91.00           | 330.21      | 6,455.86              | 3,265.53     | 596.45       | 14,448,407.69       | 1,703,792.90       | 39.78467897 | -80.77440458 |
| 9,899.98              | 91.00           | 330.21      | 6,454.12              | 3,352.30     | 546.78       | 14,448,494.46       | 1,703,743.22       | 39.78491761 | -80.77458062 |
| 9,999.98              | 91.00           | 330.21      | 6,452.37              | 3,439.07     | 497.10       | 14,448,581.23       | 1,703,693.55       | 39.78515626 | -80.77475666 |
| 10,099.98             | 91.00           | 330.21      | 6,450.63              | 3,525.85     | 447.43       | 14,448,668.01       | 1,703,643.88       | 39.78539490 | -80.77493270 |
| 10,199.98             | 91.00           | 330.21      | 6,448.88              | 3,612.62     | 397.76       | 14,448,754.78       | 1,703,594.21       | 39.78563355 | -80.77510874 |
| 10,299.98             | 91.00           | 330.21      | 6,447.13              | 3,699.39     | 348.09       | 14,448,841.55       | 1,703,544.53       | 39.78587219 | -80.77528478 |
| 10,399.98             | 91.00           | 330.21      | 6,445.39              | 3,786.16     | 298.41       | 14,448,928.32       | 1,703,494.86       | 39.78611084 | -80.77546083 |
| 10,499.98             | 91.00           | 330.21      | 6,443.64              | 3,872.94     | 248.74       | 14,449,015.10       | 1,703,445.19       | 39.78634948 | -80.77563687 |
| 10,599.98             | 91.00           | 330.21      | 6,441.90              | 3,959.71     | 199.07       | 14,449,101.87       | 1,703,395.51       | 39.78658812 | -80.77581292 |
| 10,699.98             | 91.00           | 330.21      | 6,440.15              | 4,046.48     | 149.39       | 14,449,188.64       | 1,703,345.84       | 39.78682677 | -80.77598897 |
| 10,799.98             | 91.00           | 330.21      | 6,438.41              | 4,133.26     | 99.72        | 14,449,275.42       | 1,703,296.17       | 39.78706541 | -80.77616502 |
| 10,899.98             | 91.00           | 330.21      | 6,436.66              | 4,220.03     | 50.05        | 14,449,362.19       | 1,703,246.50       | 39.78730405 | -80.77634107 |
| 10,999.98             | 91.00           | 330.21      | 6,434.92              | 4,306.80     | 0.38         | 14,449,448.96       | 1,703,196.82       | 39.78754269 | -80.77651712 |
| 11,099.98             | 91.00           | 330.21      | 6,433.17              | 4,393.57     | -49.30       | 14,449,535.73       | 1,703,147.15       | 39.78778134 | -80.77669317 |
| 11,199.98             | 91.00           | 330.21      | 6,431.43              | 4,480.35     | -98.97       | 14,449,622.51       | 1,703,097.48       | 39.78801998 | -80.77686922 |
| 11,299.98             | 91.00           | 330.21      | 6,429.68              | 4,567.12     | -148.64      | 14,449,709.28       | 1,703,047.80       | 39.78825862 | -80.77704528 |
| 11,399.98             | 91.00           | 330.21      | 6,427.94              | 4,653.89     | -198.32      | 14,449,796.05       | 1,702,998.13       | 39.78849726 | -80.77722133 |
| 11,499.98             | 91.00           | 330.21      | 6,426.19              | 4,740.67     | -247.99      | 14,449,882.83       | 1,702,948.46       | 39.78873590 | -80.77739739 |
| 11,599.98             | 91.00           | 330.21      | 6,424.45              | 4,827.44     | -297.66      | 14,449,969.60       | 1,702,898.78       | 39.78897454 | -80.77757345 |
| 11,699.98             | 91.00           | 330.21      | 6,422.70              | 4,914.21     | -347.33      | 14,450,056.37       | 1,702,849.11       | 39.78921318 | -80.77774951 |
| 11,799.98             | 91.00           | 330.21      | 6,420.95              | 5,000.98     | -397.01      | 14,450,143.14       | 1,702,799.44       | 39.78945182 | -80.77792557 |
| 11,899.98             | 91.00           | 330.21      | 6,419.21              | 5,087.76     | -446.68      | 14,450,229.92       | 1,702,749.77       | 39.78969046 | -80.77810163 |
| 11,999.98             | 91.00           | 330.21      | 6,417.46              | 5,174.53     | -496.35      | 14,450,316.69       | 1,702,700.09       | 39.78992910 | -80.77827770 |
| 12,099.98             | 91.00           | 330.21      | 6,415.72              | 5,261.30     | -546.03      | 14,450,403.46       | 1,702,650.42       | 39.79016774 | -80.77845376 |
| 12,199.98             | 91.00           | 330.21      | 6,413.97              | 5,348.07     | -595.70      | 14,450,490.24       | 1,702,600.75       | 39.79040638 | -80.77862983 |
| 12,299.98             | 91.00           | 330.21      | 6,412.23              | 5,434.85     | -645.37      | 14,450,577.01       | 1,702,551.07       | 39.79064502 | -80.77880589 |
| 12,399.98             | 91.00           | 330.21      | 6,410.48              | 5,521.62     | -695.04      | 14,450,663.78       | 1,702,501.40       | 39.79088366 | -80.77898196 |
| 12,499.98             | 91.00           | 330.21      | 6,408.74              | 5,608.39     | -744.72      | 14,450,750.55       | 1,702,451.73       | 39.79112230 | -80.77915803 |
| 12,599.98             | 91.00           | 330.21      | 6,406.99              | 5,695.17     | -794.39      | 14,450,837.33       | 1,702,402.06       | 39.79136094 | -80.77933410 |
| 12,699.97             | 91.00           | 330.21      | 6,405.25              | 5,781.94     | -844.06      | 14,450,924.10       | 1,702,352.38       | 39.79159957 | -80.77951017 |
| 12,799.97             | 91.00           | 330.21      | 6,403.50              | 5,868.71     | -893.74      | 14,451,010.87       | 1,702,302.71       | 39.79183821 | -80.77968625 |
| 12,899.97             | 91.00           | 330.21      | 6,401.76              | 5,955.48     | -943.41      | 14,451,097.64       | 1,702,253.04       | 39.79207685 | -80.77986232 |
| 12,999.97             | 91.00           | 330.21      | 6,400.01              | 6,042.26     | -993.08      | 14,451,184.42       | 1,702,203.36       | 39.79231549 | -80.78003839 |
| 13,099.97             | 91.00           | 330.21      | 6,398.27              | 6,129.03     | -1,042.76    | 14,451,271.19       | 1,702,153.69       | 39.79255412 | -80.78021447 |
| 13,199.97             | 91.00           | 330.21      | 6,396.52              | 6,215.80     | -1,092.43    | 14,451,357.96       | 1,702,104.02       | 39.79279276 | -80.78039055 |
| 13,299.97             | 91.00           | 330.21      | 6,394.77              | 6,302.58     | -1,142.10    | 14,451,444.74       | 1,702,054.35       | 39.79303140 | -80.78056663 |
| 13,399.97             | 91.00           | 330.21      | 6,393.03              | 6,389.35     | -1,191.77    | 14,451,531.51       | 1,702,004.67       | 39.79327003 | -80.78074271 |
| 13,499.97             | 91.00           | 330.21      | 6,391.28              | 6,476.12     | -1,241.45    | 14,451,618.28       | 1,701,955.00       | 39.79350867 | -80.78091879 |
| 13,599.97             | 91.00           | 330.21      | 6,389.54              | 6,562.89     | -1,291.12    | 14,451,705.05       | 1,701,905.33       | 39.79374730 | -80.78109487 |
| 13,699.97             | 91.00           | 330.21      | 6,387.79              | 6,649.67     | -1,340.79    | 14,451,791.83       | 1,701,855.65       | 39.79398594 | -80.78127096 |
| 13,799.97             | 91.00           | 330.21      | 6,386.05              | 6,736.44     | -1,390.47    | 14,451,878.60       | 1,701,805.98       | 39.79422457 | -80.78144704 |
| 13,899.97             | 91.00           | 330.21      | 6,384.30              | 6,823.21     | -1,440.14    | 14,451,965.37       | 1,701,756.31       | 39.79446321 | -80.78162313 |
| 13,999.97             | 91.00           | 330.21      | 6,382.56              | 6,909.99     | -1,489.81    | 14,452,052.15       | 1,701,706.64       | 39.79470184 | -80.78179922 |
| 14,099.97             | 91.00           | 330.21      | 6,380.81              | 6,996.76     | -1,539.48    | 14,452,138.92       | 1,701,656.96       | 39.79494048 | -80.78197530 |
| 14,199.97             | 91.00           | 330.21      | 6,379.07              | 7,083.53     | -1,589.16    | 14,452,225.69       | 1,701,607.29       | 39.79517911 | -80.78215139 |
| 14,299.97             | 91.00           | 330.21      | 6,377.32              | 7,170.30     | -1,638.83    | 14,452,312.46       | 1,701,557.62       | 39.79541774 | -80.78232749 |
| 14,399.97             | 91.00           | 330.21      | 6,375.58              | 7,257.08     | -1,688.50    | 14,452,399.24       | 1,701,507.94       | 39.79565638 | -80.78250358 |
| 14,499.97             | 91.00           | 330.21      | 6,373.83              | 7,343.85     | -1,738.18    | 14,452,486.01       | 1,701,458.27       | 39.79589501 | -80.78267967 |
| 14,599.97             | 91.00           | 330.21      | 6,372.08              | 7,430.62     | -1,787.85    | 14,452,572.78       | 1,701,408.60       | 39.79613364 | -80.78285577 |
| 14,699.97             | 91.00           | 330.21      | 6,370.34              | 7,517.39     | -1,837.52    | 14,452,659.56       | 1,701,358.93       | 39.79637227 | -80.78303186 |
| 14,799.97             | 91.00           | 330.21      | 6,368.59              | 7,604.17     | -1,887.19    | 14,452,746.33       | 1,701,309.25       | 39.79661091 | -80.78320796 |
| 14,899.97             | 91.00           | 330.21      | 6,366.85              | 7,690.94     | -1,936.87    | 14,452,833.10       | 1,701,259.58       | 39.79684954 | -80.78338406 |
| 14,999.97             | 91.00           | 330.21      | 6,365.10              | 7,777.71     | -1,986.54    | 14,452,919.87       | 1,701,209.91       | 39.79708817 | -80.78356016 |
| 15,099.97             | 91.00           | 330.21      | 6,363.36              | 7,864.49     | -2,036.21    | 14,453,006.65       | 1,701,160.23       | 39.79732680 | -80.78373626 |
| 15,199.97             | 91.00           | 330.21      | 6,361.61              | 7,951.26     | -2,085.89    | 14,453,093.42       | 1,701,110.56       | 39.79756543 | -80.78391236 |





Planning Report - Geographic

Database: DB\_Jul2215dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia  
 Site: Bryan Pad  
 Well: Bryan N-06HM (slot B)  
 Wellbore: Original Hole  
 Design: rev5

Local Co-ordinate Reference:  
 TVD Reference:  
 MD Reference:  
 North Reference:  
 Survey Calculation Method:

Well Bryan N-06HM (slot B)  
 GL=1191 @ 1191.00usft  
 GL=1191 @ 1191.00usft  
 Grid  
 Minimum Curvature

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 Office of Oil and Gas  
 AUG 31 2018  
 WV Dept of Environmental Protection

Planned Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N-S (usft) | +E-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|-----------------------|-----------------|-------------|-----------------------|-------------|-------------|---------------------|--------------------|-------------|--------------|
| 15,299.97             | 91.00           | 330.21      | 6,359.87              | 8,036.03    | -2,135.58   | 14,453,180.19       | 1,701,060.89       | 39.79780406 | -80.78408846 |
| 15,399.97             | 91.00           | 330.21      | 6,358.12              | 8,124.80    | -2,185.23   | 14,453,266.96       | 1,701,011.22       | 39.79804269 | -80.78426457 |
| 15,499.97             | 91.00           | 330.21      | 6,356.38              | 8,211.58    | -2,234.90   | 14,453,353.74       | 1,700,951.54       | 39.79828132 | -80.78444088 |
| 15,599.97             | 91.00           | 330.21      | 6,354.63              | 8,298.35    | -2,284.58   | 14,453,440.51       | 1,700,911.87       | 39.79851995 | -80.78461678 |
| 15,699.97             | 91.00           | 330.21      | 6,352.89              | 8,385.12    | -2,334.25   | 14,453,527.28       | 1,700,862.20       | 39.79875858 | -80.78479289 |
| 15,799.97             | 91.00           | 330.21      | 6,351.14              | 8,471.90    | -2,383.92   | 14,453,614.06       | 1,700,812.52       | 39.79899721 | -80.78496900 |
| 15,899.97             | 91.00           | 330.21      | 6,349.40              | 8,558.67    | -2,433.60   | 14,453,700.83       | 1,700,762.85       | 39.79923584 | -80.78514511 |
| 15,999.97             | 91.00           | 330.21      | 6,347.65              | 8,645.44    | -2,483.27   | 14,453,787.60       | 1,700,713.18       | 39.79947447 | -80.78532122 |
| 16,099.97             | 91.00           | 330.21      | 6,345.90              | 8,732.21    | -2,532.94   | 14,453,874.37       | 1,700,663.50       | 39.79971310 | -80.78549734 |
| 16,199.97             | 91.00           | 330.21      | 6,344.16              | 8,818.99    | -2,582.61   | 14,453,961.15       | 1,700,613.83       | 39.79995173 | -80.78567345 |
| 16,299.97             | 91.00           | 330.21      | 6,342.41              | 8,905.76    | -2,632.29   | 14,454,047.92       | 1,700,564.16       | 39.80019035 | -80.78584957 |
| 16,399.97             | 91.00           | 330.21      | 6,340.67              | 8,992.53    | -2,681.96   | 14,454,134.69       | 1,700,514.49       | 39.80042898 | -80.78602568 |
| 16,499.97             | 91.00           | 330.21      | 6,338.92              | 9,079.30    | -2,731.63   | 14,454,221.47       | 1,700,464.81       | 39.80066761 | -80.78620180 |
| 16,599.97             | 91.00           | 330.21      | 6,337.18              | 9,166.08    | -2,781.31   | 14,454,308.24       | 1,700,415.14       | 39.80090624 | -80.78637792 |
| 16,699.97             | 91.00           | 330.21      | 6,335.43              | 9,252.85    | -2,830.98   | 14,454,395.01       | 1,700,365.47       | 39.80114486 | -80.78655404 |
| 16,799.97             | 91.00           | 330.21      | 6,333.69              | 9,339.62    | -2,880.65   | 14,454,481.78       | 1,700,315.79       | 39.80138349 | -80.78673016 |
| 16,899.97             | 91.00           | 330.21      | 6,331.94              | 9,426.40    | -2,930.32   | 14,454,568.56       | 1,700,266.12       | 39.80162212 | -80.78690628 |
| 16,999.97             | 91.00           | 330.21      | 6,330.20              | 9,513.17    | -2,980.00   | 14,454,655.33       | 1,700,216.45       | 39.80186074 | -80.78708241 |
| 17,099.97             | 91.00           | 330.21      | 6,328.45              | 9,599.94    | -3,029.67   | 14,454,742.10       | 1,700,166.78       | 39.80209937 | -80.78725853 |
| 17,199.97             | 91.00           | 330.21      | 6,326.71              | 9,686.71    | -3,079.34   | 14,454,828.88       | 1,700,117.10       | 39.80233799 | -80.78743465 |
| 17,299.97             | 91.00           | 330.21      | 6,324.96              | 9,773.49    | -3,129.02   | 14,454,915.65       | 1,700,067.43       | 39.80257662 | -80.78761079 |
| 17,399.97             | 91.00           | 330.21      | 6,323.22              | 9,860.26    | -3,178.69   | 14,455,002.42       | 1,700,017.76       | 39.80281524 | -80.78778692 |
| 17,499.97             | 91.00           | 330.21      | 6,321.47              | 9,947.03    | -3,228.36   | 14,455,089.19       | 1,699,968.08       | 39.80305387 | -80.78796305 |
| 17,599.97             | 91.00           | 330.21      | 6,319.72              | 10,033.81   | -3,278.04   | 14,455,175.97       | 1,699,918.41       | 39.80329249 | -80.78813918 |
| 17,699.96             | 91.00           | 330.21      | 6,317.98              | 10,120.58   | -3,327.71   | 14,455,262.74       | 1,699,868.74       | 39.80353112 | -80.78831531 |
| 17,799.96             | 91.00           | 330.21      | 6,316.23              | 10,207.35   | -3,377.38   | 14,455,349.51       | 1,699,819.07       | 39.80376974 | -80.78849144 |
| 17,899.96             | 91.00           | 330.21      | 6,314.49              | 10,294.12   | -3,427.05   | 14,455,436.28       | 1,699,769.39       | 39.80400836 | -80.78866758 |
| 17,999.96             | 91.00           | 330.21      | 6,312.74              | 10,380.90   | -3,476.73   | 14,455,523.06       | 1,699,719.72       | 39.80424699 | -80.78884371 |
| 18,099.96             | 91.00           | 330.21      | 6,311.00              | 10,467.67   | -3,526.40   | 14,455,609.83       | 1,699,670.05       | 39.80448561 | -80.78901985 |
| 18,199.96             | 91.00           | 330.21      | 6,309.25              | 10,554.44   | -3,576.07   | 14,455,696.60       | 1,699,620.37       | 39.80472423 | -80.78919598 |
| 18,299.96             | 91.00           | 330.21      | 6,307.51              | 10,641.22   | -3,625.75   | 14,455,783.38       | 1,699,570.70       | 39.80496285 | -80.78937213 |
| 18,399.96             | 91.00           | 330.21      | 6,305.76              | 10,727.99   | -3,675.42   | 14,455,870.15       | 1,699,521.03       | 39.80520148 | -80.78954827 |
| 18,499.96             | 91.00           | 330.21      | 6,304.02              | 10,814.76   | -3,725.09   | 14,455,956.92       | 1,699,471.36       | 39.80544010 | -80.78972441 |
| 18,599.96             | 91.00           | 330.21      | 6,302.27              | 10,901.53   | -3,774.76   | 14,456,043.69       | 1,699,421.68       | 39.80567872 | -80.78990056 |
| 18,699.96             | 91.00           | 330.21      | 6,300.53              | 10,988.31   | -3,824.44   | 14,456,130.47       | 1,699,372.01       | 39.80591734 | -80.79007670 |
| 18,799.96             | 91.00           | 330.21      | 6,298.78              | 11,075.08   | -3,874.11   | 14,456,217.24       | 1,699,322.34       | 39.80615596 | -80.79025285 |
| 18,899.96             | 91.00           | 330.21      | 6,297.04              | 11,161.85   | -3,923.78   | 14,456,304.01       | 1,699,272.66       | 39.80639458 | -80.79042899 |
| 18,999.96             | 91.00           | 330.21      | 6,295.29              | 11,248.62   | -3,973.46   | 14,456,390.79       | 1,699,222.99       | 39.80663320 | -80.79060514 |
| 19,099.96             | 91.00           | 330.21      | 6,293.54              | 11,335.40   | -4,023.13   | 14,456,477.56       | 1,699,173.32       | 39.80687183 | -80.79078129 |
| 19,199.96             | 91.00           | 330.21      | 6,291.80              | 11,422.17   | -4,072.80   | 14,456,564.33       | 1,699,123.65       | 39.80711045 | -80.79095744 |
| 19,299.96             | 91.00           | 330.21      | 6,290.05              | 11,508.94   | -4,122.47   | 14,456,651.10       | 1,699,073.97       | 39.80734907 | -80.79113360 |
| 19,399.96             | 91.00           | 330.21      | 6,288.31              | 11,595.72   | -4,172.15   | 14,456,737.88       | 1,699,024.30       | 39.80758768 | -80.79130975 |
| 19,499.96             | 91.00           | 330.21      | 6,286.56              | 11,682.49   | -4,221.82   | 14,456,824.65       | 1,698,974.63       | 39.80782630 | -80.79148590 |
| 19,599.96             | 91.00           | 330.21      | 6,284.82              | 11,769.26   | -4,271.49   | 14,456,911.42       | 1,698,924.95       | 39.80806492 | -80.79166206 |
| 19,699.96             | 91.00           | 330.21      | 6,283.07              | 11,856.03   | -4,321.17   | 14,456,998.20       | 1,698,875.28       | 39.80830354 | -80.79183822 |
| 19,799.96             | 91.00           | 330.21      | 6,281.33              | 11,942.81   | -4,370.84   | 14,457,084.97       | 1,698,825.61       | 39.80854216 | -80.79201437 |
| 19,899.96             | 91.00           | 330.21      | 6,279.58              | 12,029.58   | -4,420.51   | 14,457,171.74       | 1,698,775.94       | 39.80878078 | -80.79219053 |
| 19,999.96             | 91.00           | 330.21      | 6,277.84              | 12,116.35   | -4,470.18   | 14,457,258.51       | 1,698,726.26       | 39.80901940 | -80.79236669 |
| 20,099.96             | 91.00           | 330.21      | 6,276.09              | 12,203.13   | -4,519.86   | 14,457,345.29       | 1,698,676.59       | 39.80925801 | -80.79254285 |
| 20,199.96             | 91.00           | 330.21      | 6,274.35              | 12,289.90   | -4,569.53   | 14,457,432.06       | 1,698,626.92       | 39.80949663 | -80.79271902 |
| 20,299.96             | 91.00           | 330.21      | 6,272.60              | 12,376.67   | -4,619.20   | 14,457,518.83       | 1,698,577.24       | 39.80973525 | -80.79289518 |
| 20,399.96             | 91.00           | 330.21      | 6,270.85              | 12,463.44   | -4,668.88   | 14,457,605.60       | 1,698,527.57       | 39.80997386 | -80.79307135 |
| 20,499.96             | 91.00           | 330.21      | 6,269.11              | 12,550.22   | -4,718.55   | 14,457,692.38       | 1,698,477.90       | 39.81021248 | -80.79324751 |
| 20,599.96             | 91.00           | 330.21      | 6,267.36              | 12,636.99   | -4,768.22   | 14,457,779.15       | 1,698,428.22       | 39.81045110 | -80.79342368 |
| 20,699.96             | 91.00           | 330.21      | 6,265.62              | 12,723.76   | -4,817.89   | 14,457,865.92       | 1,698,378.55       | 39.81068971 | -80.79359985 |





Planning Report - Geographic

|           |                                |                              |                            |
|-----------|--------------------------------|------------------------------|----------------------------|
| Database: | DB_Jul2216dt_v14               | Local Co-ordinate Reference: | Well Bryan N-06HM (slot B) |
| Company:  | Tug Hill Operating LLC         | TVD Reference:               | GL=1191 @ 1191.00usft      |
| Project:  | Marshall County, West Virginia | MD Reference:                | GL=1191 @ 1191.00usft      |
| Site:     | Bryan Pad                      | North Reference:             | Grid                       |
| Well:     | Bryan N-06HM (slot B)          | Survey Calculation Method:   | Minimum Curvature          |
| Wellbore: | Original Hole                  |                              |                            |
| Design:   | rev5                           |                              |                            |

| Planned Survey        |                 |             |                       |              |              |                     |                    |             |              |  |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |  |
| 20,799.96             | 91.00           | 330.21      | 6,263.87              | 12,810.54    | -4,867.57    | 14,457,952.70       | 1,698,328.88       | 39.81092833 | -80.79377602 |  |
| 20,899.96             | 91.00           | 330.21      | 6,262.13              | 12,897.31    | -4,917.24    | 14,458,039.47       | 1,698,279.21       | 39.81116894 | -80.79395219 |  |
| 20,999.96             | 91.00           | 330.21      | 6,260.38              | 12,984.08    | -4,966.91    | 14,458,126.24       | 1,698,229.53       | 39.81140556 | -80.79412836 |  |
| 21,099.96             | 91.00           | 330.21      | 6,258.64              | 13,070.85    | -5,016.59    | 14,458,213.01       | 1,698,179.86       | 39.81164417 | -80.79430454 |  |
| 21,199.96             | 91.00           | 330.21      | 6,256.89              | 13,157.63    | -5,066.26    | 14,458,299.79       | 1,698,130.19       | 39.81188279 | -80.79448071 |  |
| 21,299.96             | 91.00           | 330.21      | 6,255.15              | 13,244.40    | -5,115.93    | 14,458,386.56       | 1,698,080.51       | 39.81212140 | -80.79465689 |  |
| 21,399.96             | 91.00           | 330.21      | 6,253.40              | 13,331.17    | -5,165.61    | 14,458,473.33       | 1,698,030.84       | 39.81236002 | -80.79483307 |  |
| 21,499.96             | 91.00           | 330.21      | 6,251.66              | 13,417.94    | -5,215.28    | 14,458,560.11       | 1,697,981.17       | 39.81259863 | -80.79500925 |  |
| 21,599.96             | 91.00           | 330.21      | 6,249.91              | 13,504.72    | -5,264.95    | 14,458,646.88       | 1,697,931.50       | 39.81283724 | -80.79518543 |  |
| 21,699.96             | 91.00           | 330.21      | 6,248.17              | 13,591.49    | -5,314.62    | 14,458,733.65       | 1,697,881.82       | 39.81307586 | -80.79536161 |  |
| 21,799.96             | 91.00           | 330.21      | 6,246.42              | 13,678.26    | -5,364.30    | 14,458,820.42       | 1,697,832.15       | 39.81331447 | -80.79553779 |  |
| 21,899.96             | 91.00           | 330.21      | 6,244.67              | 13,765.04    | -5,413.97    | 14,458,907.20       | 1,697,782.48       | 39.81355308 | -80.79571397 |  |
| 21,995.89             | 91.00           | 330.21      | 6,243.00              | 13,848.28    | -5,461.62    | 14,458,990.44       | 1,697,734.82       | 39.81378199 | -80.79588299 |  |

PBHL/TD 21995.89 MD/6243.00 TVD

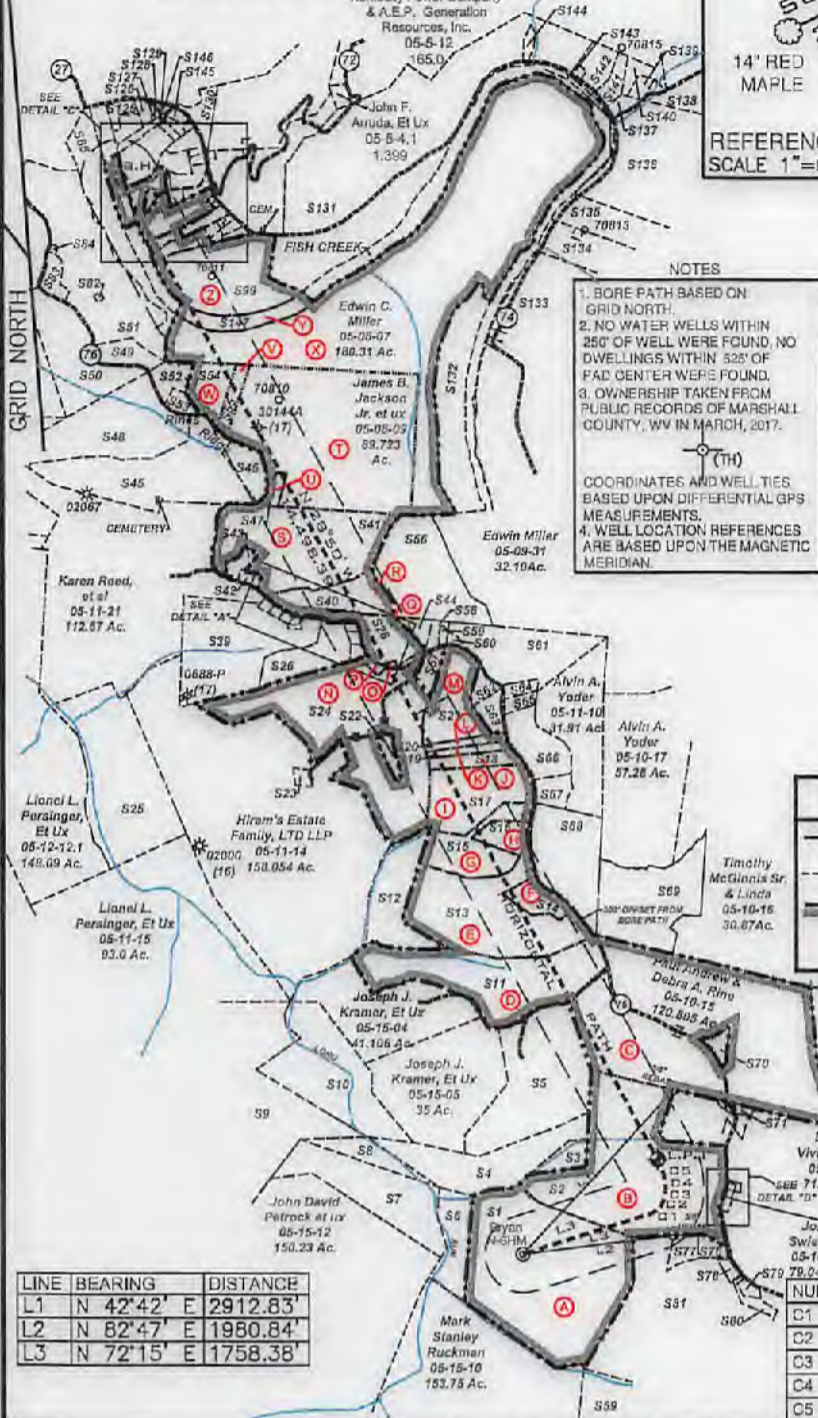
| Design Targets   |               |              |            |              |              |                 |                |             |              |  |
|--|---------------|--------------|------------|--------------|--------------|-----------------|----------------|-------------|--------------|--|
| Target Name  | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude    | Longitude    |  |
| BHL Bryan N-06HM r5<br>- hit/miss target<br>- Shape<br>- Point   | 0.00          | 0.00         | 6,243.00   | 13,848.28    | -5,461.62    | 14,458,990.44   | 1,697,734.82   | 39.81378200 | -80.79588300 |  |
| LP Bryan N-06HM 45 W<br>- plan hits target center<br>- Point   | 0.00          | 0.00         | 6,496.00   | 1,269.97     | 1,738.80     | 14,446,412.13   | 1,704,935.25   | 39.77919065 | -80.77035649 |  |
| LP Bryan N-06HM<br>- plan misses target center by 44.99usft at 7500.40usft MD (6496.00 TVD, 1270.11 N, 1738.72 E)<br>- Point | 0.00          | 0.00         | 6,496.00   | 1,292.47     | 1,777.77     | 14,446,434.63   | 1,704,974.22   | 39.77925215 | -80.77021759 |  |

| Plan Annotations      |                       |                   |              |                                 |   |
|-----------------------|-----------------------|-------------------|--------------|---------------------------------|---|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                         |   |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                                 |   |
| 1,400.00              | 1,400.00              | 0.00              | 0.00         | KOP Begin 2°/100' build         | <p>RECEIVED<br/>Office of Oil and Gas</p> <p>AUG 31 2018</p> <p>WV Department of<br/>Environmental Protection</p> |
| 1,600.00              | 1,599.84              | 2.24              | 6.81         | Begin 4.00° tangent             |   |
| 3,204.07              | 3,200.00              | 38.15             | 112.58       | Begin 2°/100' build/turn        |   |
| 5,004.77              | 4,842.15              | 251.00            | 741.23       | Begin 40.01° tangent            |   |
| 6,521.51              | 6,003.80              | 563.73            | 1,664.96     | Begin 10°/100' build/turn       |   |
| 7,500.24              | 6,496.00              | 1,269.97          | 1,738.80     | Begin 91.00° lateral section    |   |
| 21,995.89             | 6,243.00              | 13,848.28         | -5,461.62    | PBHL/TD 21995.89 MD/6243.00 TVD |   |

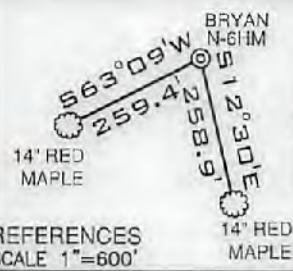


# BRYAN LEASE WELL N-6HM 969.9328± ACRES

Kentucky Power Company & A.E.P. Generation Resources, Inc. 05-6-12 165.0

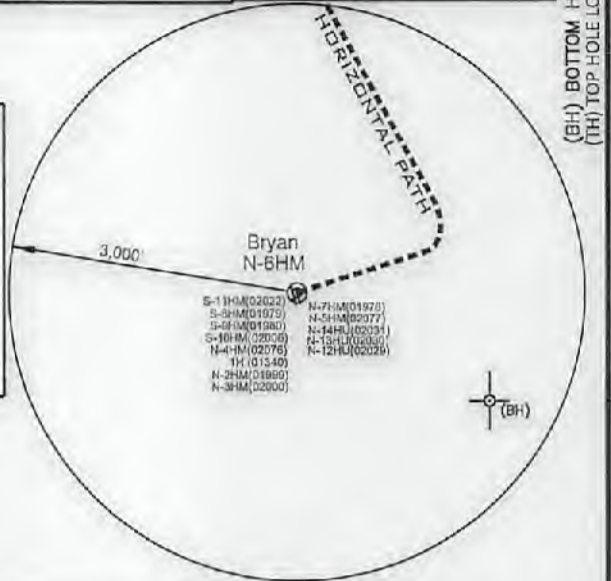


REFERENCES SCALE 1"=600'



TOP HOLE LATITUDE: 39°47'30"  
 BOTTOM HOLE LATITUDE: 39°50'00"  
 S-11HM(02022) ○ N-7HM(01978)  
 S-8HM(01979) ○ N-8HM(01977)  
 S-9HM(01980) ○ N-9HM(01977)  
 S-10HM(02008) ○ N-10HM(02031)  
 N-4HM(02076) ○ N-11HM(02031)  
 1H(01340) ○ N-13HU(02030)  
 N-2HM(01999) ○ N-12HU(02029)  
 N-3HM(02000) ○

DETAIL SKETCH "A" SCALE 1"=800'



**NOTES**  
 1. BORE PATH BASED ON GRID NORTH.  
 2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 525' OF FAD CENTER WERE FOUND.  
 3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017.  
 4. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.  
 COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.

**LEGEND**

- LEASED TRACTS
- - - SURFACE TRACTS
- UNIT BOUNDARY
- (A) LEASE # (SEE GA1 FORM)

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

**SURFACE HOLE**  
 UTM. NAD83, ZONE 17 IN METERS  
 N) 4,402,888.14  
 E) 519,135.32

**LANDING POINT 1**  
 UTM. NAD83, ZONE 17 IN METERS  
 N) 4,403,275.22  
 E) 519,665.30

**BOTTOM HOLE**  
 UTM. NAD83, ZONE 17 IN METERS  
 N) 4,407,109.10  
 E) 517,470.61

| LINE | BEARING    | DISTANCE |
|------|------------|----------|
| L1   | N 42°42' E | 2912.83' |
| L2   | N 82°47' E | 1980.84' |
| L3   | N 72°15' E | 1758.38' |

| NUMBER | CHORD DIRECTION | RADIUS | ARC LENGTH | CHORD LENGTH |
|--------|-----------------|--------|------------|--------------|
| C1     | N 54°24' E      | 238.08 | 147.72     | 145.37       |
| C2     | N 24°13' E      | 340.15 | 144.92     | 143.82       |
| C3     | N 03°21' E      | 543.79 | 169.13     | 168.45       |
| C4     | N 12°22' W      | 769.98 | 189.71     | 189.23       |
| C5     | N 24°02' W      | 890.95 | 149.54     | 149.36       |

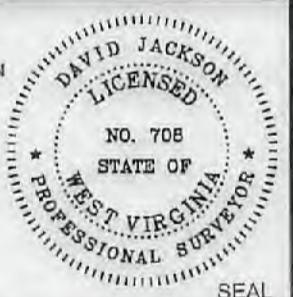
FILE NUMBER \_\_\_\_\_  
 DRAWING NUMBER BRYAN\_WP\_N-6HM  
 SCALE 1" = 2500'  
 MINIMUM DEGREE OF ACCURACY 1/200  
 PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 708  
*David L Jackson*



JACKSON SURVEYING INC.  
 P.O. Box 1460  
 Clarksburg, WV 26302  
 304-823-5851



WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET, SE  
 CHARLESTON, WV 25304

DATE: SEPTEMBER 19, 2017  
 REVISED DATE: AUGUST 30, 2018  
 OPERATORS WELL NO. BRYAN N-6HM  
 API WELL NO. \_\_\_\_\_  
47-051-01977 MOD  
 STATE COUNTY PERMIT

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
 LOCATION ELEVATION 1191.0' WATERSHED (HUC 10) Fish Creek  
 DISTRICT Franklin COUNTY Marshall  
 QUADRANGLE Powhatan Point 7.5' LEASE NUMBER SEE WW-6A1 Form  
 SURFACE OWNER CNX LAND RESOURCES, INC. ACREAGE 81.98  
 OIL & GAS ROYALTY OWNER MICHAEL R. BRYAN - SEE WW 6A1 LEASE ACREAGE 81.98  
 PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_  
 TARGET FORMATION Marcellus ESTIMATED DEPTH TVD: 6,596' TMD: 21,996'  
 WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM  
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

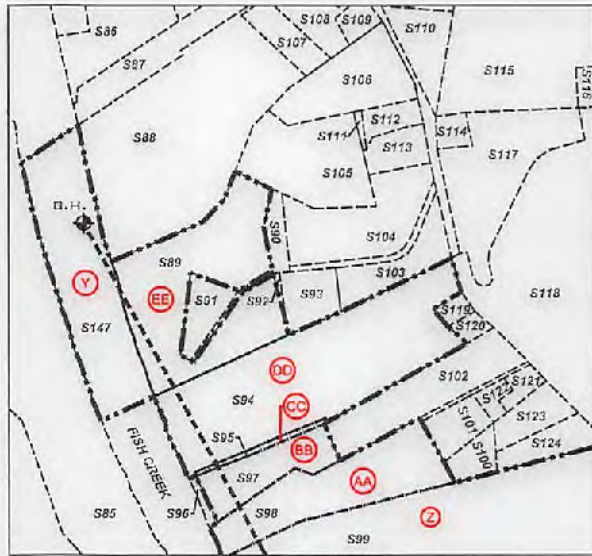
COUNTY NAME  
 PERMIT



**BRYAN LEASE  
WELL N-6HM  
969.9328± ACRES**



DETAIL "A"  
SCALE 1"=400'



DETAIL "C"  
SCALE 1"=500'



DETAIL "B"  
SCALE 1"=250'



P.S.  
708

*David L Jackson*



**TUG HILL  
OPERATING**

OPERATOR'S  
WELL #: Bryan N-6HM  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV

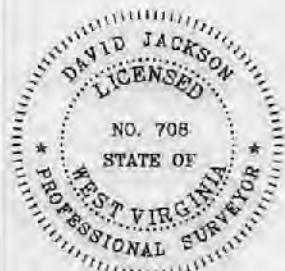
WELL PLAT  
PAGE 2 OF 3  
DATE: 9/19/2017  
REVISED DATE:  
8/30/18



**BRYAN LEASE  
WELL N-6HM  
969.9328± ACRES**

| Number | TAX MAP-PARCEL | ADJOINER OWNER                                    | ACRES   |
|--------|----------------|---|---------|
| S1     | 05-15-9        | CNX Land Resources, Inc.                          | 81.98   |
| S2     | 05-15-8        | Terry D. Rosa, et ux                              | 77.11   |
| S3     | 05-15-7        | Terry D. Rosa, et ux                              | 4.5     |
| S4     | 05-15-6.1      | Joseph J. Kramer, et ux                           | 39.40   |
| S5     | 05-15-6        | Joseph J. Kramer, et ux                           | 42.5    |
| S6     | 05-15-13       | CNX Land Resources, Inc.                          | 11.0    |
| S7     | 05-15-14       | John David Patrick, et ux                         | 25.0    |
| S8     | 05-15-2        | John David Patrick, et ux                         | 5.0     |
| S9     | 05-15-1        | Marcus Sharp & David Schlabach, Hrs.              | 121.0   |
| S10    | 05-15-3        | Joseph J. Kramer, et ux                           | 36.10   |
| S11    | 05-11-12       | Joseph J. Kramer, et ux                           | 43.2168 |
| S12    | 05-11-13       | Joy D. Gartman & Arlin Gatts                      | 12.29   |
| S13    | 05-11-11.3     | Herman D. Lantz                                   | 43.96   |
| S14    | 05-11-11.1     | Nellis Marie & Robert W. Spencer                  | 5.813   |
| S15    | 05-11-11.4     | Brad M. & Amanda J. Blake                         | 15.193  |
| S16    | 05-11-11       | Brad M. & Amanda J. Blake                         | 5.0     |
| S17    | 05-11-9        | Edwin C. & Kimberly A. Miller                     | 54.625  |
| S18    | 05-11-9.9      | Leonard L. Parsons, et ux                         | 5.89    |
| S19    | 05-11-9.8      | Southern Country Farms, Inc                       | 2.486   |
| S20    | 05-11-9.5      | Southern Country Farms, Inc                       | 2.559   |
| S21    | 05-11-9.3      | Joseph M. & Steven Haught                         | 16.3    |
| S22    | 05-11-16.2     | Joseph Haught                                     | 2.181   |
| S23    | 05-11-14.1     | Denris F. Moore, et ux                            | 1.056   |
| S24    | 05-11-16       | Keith E. Haught, et al                            | 83.674  |
| S25    | 05-12-11       | Wesley R. Bryan & Wesley R. Bryan II              | 52.478  |
| S26    | 05-11-17.2     | Brenda & Michael Bryan                            | 11.504  |
| S27    | 05-11-5.1      | James R. Anderson, et ux                          | 0.205   |
| S28    | 05-11-5        | Kevin R. Corley, et ux                            | 10.36   |
| S29    | 05-11-16.1     | Susan Marie Smith, (Life)                         | 0.876   |
| S30    | 05-11-25       | Owen Michael Barr                                 | 0.598   |
| S31    | 05-11-23       | Owen Michael Barr                                 | 0.845   |
| S32    | 05-11-24       | Charles Edward Purbee, et ux                      | 0.603   |
| S33    | 05-11-5.2      | Rickey Lynn & Victoria Rose Cross                 | 1.0     |
| S34    | 05-11-17.1     | David Gray  | 0.297   |
| S35    | 05-11-22       | David Gray  | 0.353   |
| S36    | 05-11-18       | David E. Gray                                     | 0.569   |
| S37    | 05-11-19       | David E. Gray                                     | 0.532   |
| S38    | 05-11-20       | David E. Gray                                     | 0.569   |
| S39    | 05-11-17       | Kevin R. Corley, et ux                            | 36.13   |
| S40    | 05-11-3        | Kevin R. Corley, et ux                            | 13.18   |
| S41    | 05-11-2        | Walter C. Cheryl A. Rine                          | 42.367  |
| S42    | 05-11-2.1      | Walter C. & Cheryl A. Rine                        | 1.19    |
| S43    | 05-11-2.2      | Joshua A. Myers                                   | 2.193   |
| S44    | 05-11-5.3      | Robert Harris Arrick, et ux                       | 3.0     |
| S45    | 05-11-1.1      | Larry W. Dunlap & Charles Lee Dunlap              | 34.405  |
| S46    | 05-11-1.2      | Jay A. Conner, et ux                              | 5.824   |
| S47    | 05-8-9.1       | Scott E. Jackson, Tammy S. South & Marlon Jackson | 1.957   |
| S48    | 05-11-1.4      | Larry W. Dunlap, et al                            | 32.493  |
| S49    | 05-7-32        | William N. & Virginia A. Rouse                    | 4.2     |
| S50    | 05-7-33        | William N. Rouse                                  | 24.60   |
| S51    | 05-7-31        | William N. Rouse et ux                            | 43.147  |
| S52    | 05-11-1        | William N. & Virginia A. Rouse                    | 4.527   |
| S53    | 05-11-1.6      | Debra Moms  | 2.093   |
| S54    | 05-11-1.7      | William S. & Mary K. Adams                        | 8.0     |
| S55    | 05-11-1.5      | Paul & Sandy Whitt                                | 3.507   |
| S56    | 05-11-4        | David H. Arrick, et ux                            | 31.5    |
| S57    | 05-11-16.3     | Kegan Michael Haught - Life                       | 3.265   |
| S58    | 05-11-6        | Robert & Rebecca Arrick                           | 1.29    |
| S59    | 05-11-7        | Baptist Cemetery                                  | 1.0     |
| S60    | 05-11-8        | Baptist Church                                    | 0.8     |
| S61    | 05-11-9        | Edwin C. & Kimberly A. Miller                     | 54.625  |
| S62    | 05-11-9.10     | John A. & Janet L. Seucks                         | 2.348   |
| S63    | 05-11-9.2      | Michael R. Bryan                                  | 3.143   |
| S64    | 05-11-9.8      | Sean F. Moore                                     | 2.070   |
| S65    | 05-11-9.7      | Sean F. Moore                                     | 2.026   |
| S66    | 05-11-9.1      | Jack Shephard Huggins Jr., et al                  | 10.92   |
| S67    | 05-11-9.4      | Jack S. Huggins, et ux                            | 4.129   |
| S68    | 05-11-11.2     | Wesley R. Bryan & Wesley R. Bryan II              | 25.031  |
| S69    | 05-10-16.4     | Melvin E. Jr. & Elizabeth Ferguson                | 30.87   |
| S70    | 05-10-15.1     | Donald T. Miller                                  | 2.095   |

| Number | TAX MAP-PARCEL | ADJOINER OWNER   | ACRES  |
|--------|----------------|--|--------|
| S71    | 05-16-3.2      | Jimmy Lee Ostrander Jr., Sheena Lynn Ostrander & Brody Ray Ostrander | 1.435  |
| S72    | 05-16-3.1      | Dennis Jackson, et ux  | 0.27   |
| S73    |                | Cemetery - No Deed   |        |
| S74    | 05-16-2        | Christian Church   | 0.19   |
| S75    | 05-16-1        | Christian Church   | 0.50   |
| S76    | 05-16-23.1     | Ray E. Minor, et ux  | 2.0    |
| S77    | 05-16-23.4     | Michael R. & Brenda K. Bryan   | 3.0    |
| S78    | 05-16-23.3     | Greg & Christina Riddle  | 1.0    |
| S79    | 05-16-24       | Alan M. Baysar, et ux  | 1.083  |
| S80    | 05-16-23.2     | Alan M. Baysar, et ux  | 1.726  |
| S81    | 05-16-23       | CNX Land Resources, Inc.   | 50.136 |
| S82    | 05-7-31.4      | Grandview-Doolan PSD   | 0.23   |
| S83    | 05-7-31.2      | William N. Rouse Et Ux   | 3.304  |
| S84    | 05-7-31.3      | William N. & Virginia A. Rouse                                       | 0.230  |
| S85    | 05-7-31.1      | David L. & Lori M. Yoders  | 30.115 |
| S86    | 05-8A-16       | Jon David Fromhart   | 2.0    |
| S87    | 05-8A-26       | Albert James Anderson Jr.  | 1.605  |
| S88    | 05-8A-27       | Clarence S. Siburt, Et Ux  | 8.296  |
| S89    | 05-8A-39       | Barbara L. Daniels & Elaine Willis                                   | 3.223  |
| S90    | 05-8A-38       | William J. Gamble, Et Ux   | 0.354  |
| S91    | 05-8A-40       | Barbara L. Daniels & Elaine Willis                                   | 0.827  |
| S92    | 05-8A-41       | William J. Gamble, Et Ux   | 0.046  |
| S93    | 05-8A-37       | William J. Gamble, Et Ux   | 0.706  |
| S94    | 05-8A-42       | Robert M. White  | 7.23   |
| S95    | 05-8A-49       | Raymond Scott, Jr. & Larrlette                                       | 0.159  |
| S96    | 05-8A-45       | Raymond Scott, Jr. & Larrlette                                       | 0.305  |
| S97    | 05-8A-46       | Barbara L. & Mary L. Rose  | 1.5    |
| S98    | 05-8A-47       | Barbara L. & Mary L. Rose  | 3.0    |
| S99    | 05-8-4.1       | Frances E. Nieman  | 33.46  |
| S100   | 05-8A-53       | Frances E. Nieman  | 0.422  |
| S101   | 05-8A-52       | Barbara L. & Mary L. Rose  | 0.59   |
| S102   | 05-8A-48       | Raymond Scott, Jr. & Larrlette                                       | 2.12   |
| S103   | 05-8A-36       | William J. & Linda E. & Enn R. Gamble                                | 1.031  |
| S104   | 05-8A-33       | Elaine Willis & Jeffrey D. Brooks                                    | 2.517  |
| S105   | 05-8A-31       | Randall K. Keener, Et Ux   | 2.346  |
| S106   | 05-8A-28       | Norman G. Johnson (Life)   | 2.0    |
| S107   | 05-8A-24       | Clarence Paul Siburt   | 0.653  |
| S108   | 05-8A-23       | Danny Lee & Leona May Darrah   | 0.738  |
| S109   | 05-8A-25       | Charles & Whitney Woods  | 2.6    |
| S110   | 05-8A-14       | Board Of Education   | 1.0    |
| S111   | 05-8A-30       | Randall Keith Keener, Et Ux  | 0.059  |
| S112   | 05-8A-29       | Cathanna P. Rine   | 0.394  |
| S113   | 05-8A-32       | Jonathan David Boop  | 0.580  |
| S114   | 05-8A-34       | Norman G Johnson, Et Ux (Life)                                       | 0.25   |
| S115   | 05-8-3         | Tammy L. Mitchell  | 35.07  |
| S116   | 05-8-23        | Robert L. & Donald Shields   | 0.46   |
| S117   | 05-8A-35       | Jerad C. Sells   | 2.780  |
| S118   | 05-8-4         | C. Wayne Bentsford   | 23.355 |
| S119   | 05-8A-43       | Charles G. Stein & Eva A. Wade                                       | 0.17   |
| S120   | 05-8A-44       | Charles G. Stein & Eva A. Wade                                       | 0.18   |
| S121   | 05-8A-50       | Lucretia M. Harrison   | 0.277  |
| S122   | 05-8A-51       | Lucretia M. Harrison   | 0.210  |
| S123   | 05-8A-54       | David D. & Christine S. Daniels                                      | 0.68   |
| S124   | 05-8A-54.1     | David D. & Christine S. Daniels                                      | 0.69   |
| S125   | 05-8A-15       | June Morris  | 2.06   |
| S126   | 05-8A-17       | Isaac Luke Vanscyoc  | 1.44   |
| S127   | 05-8A-18       | David D. & Christine S. Daniels                                      | 0.25   |
| S128   | 05-8A-19       | David D. & Christine S. Daniels                                      | 0.25   |
| S129   | 05-8A-21       | David D. & Christine S. Daniels                                      | 0.122  |
| S130   | 05-8A-13       | Lelha J. Ruckman   | 2.993  |
| S131   | 05-8-5         | Richard L. Gatts (Life)  | 86.819 |
| S132   | 05-8-8         | James Edward Francis, Et Ux  | 28.3   |
| S133   | 05-9-35        | Lloyd C. & Judith C. Arnold  | 47.0   |
| S134   | 05-9-2         | James R. Legg Estate   | 23.141 |
| S135   | 05-9-2.1       | Jeffery L. Legg  | 20.5   |
| S136   | 05-9-1         | Sheldon Ray Ruckman & Marvin Edgar Ruckman                           | 57.683 |
| S137   | 05-9-1.2       | Marvin E. Ruckman  | 1.359  |
| S138   | 05-4-17        | JPM Properties, LLC  | 5.0    |
| S139   | 05-4-19        | William L. Maxwell Jr.   | 1.5    |
| S140   | 05-4-18        | William L. Maxwell Jr.   | 3.0    |
| S141   | 05-9-1.3       | Marvin E. Ruckman Et Ux  | 3.326  |
| S142   | 05-9-1.4       | Sheldon R. Ruckman Et Al Life  | 4.494  |
| S143   | 05-9-1.1       | Beverly E. Clark   | 0.52   |
| S144   | 05-8-6         | Richard L. Gatts - Life  | 1.181  |
| S145   | 05-8A-22       | Whitney Woods  | 0.715  |
| S146   | 05-8A-10       | David D. & Christine S. Daniels                                      | 0.20   |
| S147   | Fish Creek     | State of W.V.  | 12.26  |



P.S. 708 *David L Jackson*

**TUG HILL**  
OPERATING

|                    |                    |                              |
|--------------------|--------------------|------------------------------|
| OPERATOR'S WELL #: | <i>Bryan N-6HM</i> | WELL PLAT                    |
| DISTRICT:          | <i>Franklin</i>    | PAGE 3 OF 3                  |
| COUNTY:            | <i>Marshall</i>    | DATE: <i>9/19/2017</i>       |
| STATE:             | <i>WV</i>          | REVISED DATE: <i>8/30/18</i> |



WW-6A1  
(5/13)

Operator's Well No. Bryan N-6HM

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

| Lease Name or Number | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | Book/Page |
|----------------------|-----------------------|-----------------------|---------|-----------|
|----------------------|-----------------------|-----------------------|---------|-----------|

\*See attached list

**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Tug Hill Operating, LLC  
 By: Amy L. Miller *Amy Miller*  
 Its: Permitting Specialist



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|-----------|------|-----------|------------------------|------------------------------|---------|------|------|--|--|--|---|--|---|--|--|
| 10*19294  | A    | 5-15-9    | BRYAN MICHAEL ET UX    | TRIENERGY, INC.              | 1/8+    | 741  | 78   | N/A  | 20/348 TriEnergy Inc to AB Resources LLC   | 21/491 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership | 685/643 Chief Exploration & Development LLC and Radler 2000 Limited Partnership to Enerplus Resources (USA) Corporation | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 756/397 AB Resources LLC to Chevron USA Inc   | 28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc | 40/57 Chevron USA Inc to TH Exploration LLC  |
| 10*19340  | B    | 5-15-8    | YOHO DONNA VIVIAN      | GASTAR EXPLORATION USA, INC. | 1/8+    | 665  | 407  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC | 23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC | 23/633 AB Resources LLC to TriEnergy Holdings LLC  | 24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership                      | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc. | 756/397 AB Resources LLC to Chevron USA Inc                        | 40/57 Chevron USA Inc to TH Exploration LLC  |
| 10*19017  | C    | 5-10-15   | RINE PAUL ANDREW ET UX | CHEVRON U.S.A. INC           | 1/8+    | 796  | 24   | N/A  | N/A  | N/A  | N/A   | N/A  | N/A   | N/A  | 40/127 Chevron USA Inc to TH Exploration LLC |
| 10*19293  | D    | 5-11-12   | KRAMAR JOSEPH ET UX    | TRIENERGY, INC.              | 1/8+    | 655  | 566  | N/A  | N/A  | 19/623 TriEnergy Inc to AB Resources LLC   | 24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership                      | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc                    | 756/397 AB Resources LLC to Chevron USA Inc                        | 40/57 Chevron USA Inc to TH Exploration LLC  |
| 10*19336  | E    | 5-11-11.3 | DAWSON BONNIE ET UX    | GASTAR EXPLORATION USA, INC. | 1/8+    | 665  | 397  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC | 23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC | 23/633 AB Resources LLC to TriEnergy Holdings LLC  | 24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership                      | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc. | 756/397 AB Resources LLC to Chevron USA Inc                        | 40/57 Chevron USA Inc to TH Exploration LLC  |



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|-----------|------|-----------|---------------------------|------------------------------|---------|------|------|--|--|--|--|--|---|---|--|
| 10*19141  | F    | 5-11-11.1 | SPENCER ROBERT W JR ET UX | GASTAR EXPLORATION USA, INC. | 1/8+    | 706  | 468  | N/A  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC                     | 23/624 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC, Chief Exploration & Development LLC, Radler 2000 Limited Partnership and Enerplus Resources USA Corp | 24/1 AB Resources LLC, Chief Exploration & Development LLC, Radler 2000 Limited Partnership, Enerplus Resources Corp to TriEnergy Holdings LLC | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc. | 756/397 AB Resources LLC to Chevron USA Inc                                     | 40/127 Chevron USA Inc to TH Exploration LLC |
| 10*19336  | G    | 5-11-11.4 | DAWSON BONNIE ET UX       | GASTAR EXPLORATION USA, INC. | 1/8+    | 665  | 397  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC | 23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC | 23/633 AB Resources LLC to TriEnergy Holdings LLC  | 24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership   | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc. | 756/397 AB Resources LLC to Chevron USA Inc                                     | 40/57 Chevron USA Inc to TH Exploration LLC  |
| 10*19336  | H    | 5-11-11   | DAWSON BONNIE ET UX       | GASTAR EXPLORATION USA, INC. | 1/8+    | 665  | 397  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC | 23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC | 23/633 AB Resources LLC to TriEnergy Holdings LLC  | 24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership   | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc. | 756/397 AB Resources LLC to Chevron USA Inc                                     | 40/57 Chevron USA Inc to TH Exploration LLC  |
| 10*14099  | I    | 5-11-9    | SOUTHERN COUNTRY FARMS    | GASTAR EXPLORATION USA, INC. | 1/8+    | 666  | 489  | N/A  | N/A  | N/A  | N/A  | N/A  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA Inc | 40/127 Chevron USA Inc to TH Exploration LLC |
| 10*19158  | J    | 5-11-9.9  | PARSONS LEONARD ET UX     | GASTAR EXPLORATION USA, INC. | 1/8+    | 705  | 125  | N/A  | N/A  | N/A  | N/A  | N/A  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA Inc | 40/127 Chevron USA Inc to TH Exploration LLC |
| 10*14099  | K    | 5-11-9.6  | SOUTHERN COUNTRY FARMS    | GASTAR EXPLORATION USA, INC. | 1/8+    | 666  | 489  | N/A  | N/A  | N/A  | N/A  | N/A  | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA Inc | 40/127 Chevron USA Inc to TH Exploration LLC |



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|-----------|------|-----------|---|---|---------|------|------|------------|------------|------------|------------|------------|---|---|---|---|
| 10*14099  | L    | 5-11-9.5  | SOUTHERN COUNTRY FARMS                                | GASTAR EXPLORATION USA, INC.                            | 1/8+    | 666  | 489  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA Inc | 40/127 Chevron USA Inc to TH Exploration LLC                |
| 10*18339  | M    | 5-11-9.3  | RESOURCE MINERALS HEADWATER I, LP                     | TH EXPLORATION LLC                                      | 1/8+    | 940  | 448  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | N/A   | N/A   | N/A   |
| 10*19139  | N    | 5-11-16   | MOORE HIRAM V - SFX                                   | GASTAR EXPLORATION USA, INC.                            | 1/8+    | 699  | 53   | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA     | 40/127 Chevron USA Inc to TH Exploration LLC                |
| 10*19179  | N    | 5-11-16   | HAUGHT KEITH ET UX - SFX                              | GASTAR EXPLORATION USA, INC.                            | 1/8+    | 710  | 587  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA     | 40/127 Chevron USA Inc to TH Exploration LLC                |
| 10*19180  | N    | 5-11-16   | HAUGHT STEVEN - SFX                                   | TRIENERGY, INC. - LEASE SAYS GASTAR EXPLORATION USA INC | 1/8+    | 710  | 67   | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA     | 40/127 Chevron USA Inc to TH Exploration LLC                |
| 10*19178  | N    | 5-11-16   | HAUGHT JOSEPH - SFX                                   | GASTAR EXPLORATION USA, INC.                            | 1/8+    | 710  | 69   | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | 23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC  | 32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA     | 40/127 Chevron USA Inc to TH Exploration LLC                |
| 10*19139  | O    | 5-11-16.1 | HIRAM V MOORE   | GASTAR EXPLORATION USA INC                              | 1/8+    | 699  | 53   | N/A        | N/A        | N/A        | N/A        | N/A        | 21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc | 23/353 Gastar Exploration USA Inc to Atinum Marcellus I LLC   | 32/362 Gastar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc   | 40/127 Chevron USA Inc. to TH Exploration, LLC              |
| 10*19170  | O    | 5-11-16.1 | SUSAN MARIE SMITH NKA SUSAN MARIE HAMNER              | GASTAR EXPLORATION USA INC                              | 1/8+    | 706  | 583  | N/A        | N/A        | N/A        | N/A        | N/A        | 21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc | 23/353 Gastar Exploration USA Inc to Atinum Marcellus I LLC   | 32/362 Gastar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc   | 40/127 Chevron USA Inc. to TH Exploration, LLC              |
| 10*22665  | P    | 5-11-5.1  | JAMES R AND MELODY A ANDERSON                         | NOBLE ENERGY INC  | 1/8+    | 812  | 31   | N/A        | N/A        | N/A        | N/A        | N/A        | 34/167 Noble Energy Inc to CNX Gas Company LLC                              | 37/169 CNX Gas Company LLC to Noble Energy Inc                | 38/297 Noble Energy, Inc. to HG Energy II Appalachia, LLC                       | 962/488 HG Energy II Appalachia, LLC to TH Exploration, LLC |
| 10*19126  | Q    | 5-11-5    | KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE | CHEVRON USA INC   | 1/8+    | 859  | 47   | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | N/A   | N/A   | 40/127 Chevron USA Inc. to TH Exploration, LLC              |
| 10*19176  | Q    | 5-11-5    | MAUNA MAXINE BEYSER                                   | GASTAR EXPLORATION USA INC                              | 1/8+    | 710  | 602  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A   | 735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gastar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc   | 40/127 Chevron USA Inc. to TH Exploration, LLC              |



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| 10*19177  | Q    | 5-11-5 | NINA L KOVACS         | GASTAR EXPLORATION USA INC | 1/8+    | 710  | 594  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19185  | Q    | 5-11-5 | HARRIETT LODUTH FOLEY | GASTAR EXPLORATION USA INC | 1/8+    | 710  | 598  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19186  | Q    | 5-11-5 | JOEL GLOVER           | GASTAR EXPLORATION USA INC | 1/8+    | 710  | 600  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19189  | Q    | 5-11-5 | SHERRY ANN MCPHERON   | GASTAR EXPLORATION USA INC | 1/8+    | 710  | 606  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19190  | Q    | 5-11-5 | SALLY LEE RIVERA      | GASTAR EXPLORATION USA INC | 1/8+    | 710  | 590  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19191  | Q    | 5-11-5 | SHARLA BETH WEAVER    | GASTAR EXPLORATION USA INC | 1/8+    | 710  | 608  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19192  | Q    | 5-11-5 | JAMES E YOHO          | GASTAR EXPLORATION USA INC | 1/8+    | 714  | 129  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19201  | Q    | 5-11-5 | DANIEL K YOHO         | GASTAR EXPLORATION USA INC | 1/8+    | 714  | 125  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |
| 10*19202  | Q    | 5-11-5 | DEBORAH L WOOLEY      | GASTAR EXPLORATION USA INC | 1/8+    | 714  | 131  | N/A        | N/A        | N/A        | N/A        | N/A        | 735/263 Gatar Exploration USA, Inc to Atinum Marcellus I LLC | 32/362 Gatar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc | 40/127 Chevron USA Inc. to TH Exploration, LLC |







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|------------|------|------------|---|---------------------------|---------|------|------|------------|------------|---|---|--|---|---|--|--|
| 10*19219   | U    | 5-8-9.1    | SCOTT E AND TAMMY SUE JACKSON               | TRIENERGY HOLDINGS, LLC   | 1/8+    | 731  | 102  | N/A        | N/A        | N/A   | N/A   | N/A  | N/A   | 25/449 TriEnergy Holdings LLC to NPAR, LLC                      | 756/332 NPAR, LLC to Chevron USA Inc   | 40/127 Chevron USA Inc. to TH Exploration, LLC                                   |
| 10*19168   | V    | 5-11-1.5   | PAUL AND SANDY WHITT                        | CHESAPEAKE APPALACHIA LLC | 1/8+    | 715  | 565  | N/A        | N/A        | N/A   | N/A   | N/A  | N/A   | N/A   | 30/392 Chesapeake Appalachia, LLC, to Chevron USA Inc                            | 40/127 Chevron USA Inc to TH Exploration, LLC                                    |
| 10*19174   | W    | 5-11-1.7   | WILLIAM S ADAMS MARY K ADAMS                | TRIENERGY HOLDINGS, LLC   | 1/8+    | 711  | 318  | N/A        | N/A        | 24/430 TriEnergy Holdings, LLC to NPAR, LLC | 24/466 AB Resources LLC and NPAR LLC to Chief Exploration & Development, LLC and Radler 2000 Limited Partnership  | 25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc | 25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc. | 756/332 NPAR LLC to Chevron USA Inc                             | 40/127 Chevron USA Inc. to TH Exploration, LLC                                   |  |
| 10*21546   | X    | 5-8-7      | EDWIN C MILLER AND KIMBERLY A MILLER        | TH EXPLORATION, LLC       | 1/8+    | 957  | 257  | N/A        | N/A        | N/A   | N/A   | N/A  | N/A   | N/A   | N/A  | N/A  |
| Q091960000 | Y    | FISH CREEK | WEST VIRGINIA DIVISION OF NATURAL RESOURCES | NOBLE ENERGY INC          | 1/8+    | 865  | 558  | N/A        | N/A        | N/A   | N/A   | N/A  | N/A   | N/A   | 39/1 Noble Energy Inc to HG Energy Appalachia LLC                                | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| 10*19101   | Z    | 5-8-4.1    | FRANCIS E NIEMAN                            | AB RESOURCES LLC          | 1/8+    | 685  | 288  | N/A        | N/A        | N/A   | 24/466 AB Resources LLC and NPAR LLC to Chief Exploration and Development LLC and Radler 2000 Limited Partnership | 25/1 Chief Exploration and Development LLC, Radler 2000 Limited Partnership and Enerplus Resources Corporation to Chevron USA Inc            | 25/105 Chief Exploration and Development LLC, Radler 2000 Limited Partnership and Enerplus Resources Corporation to   | conveyance 756/397 AB Resources LLC to Chevron USA Inc 8/5/2011 | 40/127 Chevron USA Inc to TH Exploration, LLC                                    |  |
| Q099899000 | AA   | 5-8A-47    | THOMAS DANIEL BLUE ET UX                    | NOBLE ENERGY INC          | 1/8+    | 898  | 584  | N/A        | N/A        | N/A   | N/A   | N/A  | N/A   | 931/43 Noble Energy Inc to HG Energy Appalachia LLC             | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |  |
| Q097976007 | AA   | 5-8A-47    | CHARLES EDWIN BLU                           | NOBLE ENERGY INC          | 1/8+    | 890  | 316  | N/A        | N/A        | N/A   | N/A   | N/A  | N/A   | 39/1 Noble Energy Inc to HG Energy Appalachia LLC               | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |  |

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|------------|------|---------|-----------------------------|------------------|---------|------|------|------------|------------|------------|------------|------------|------------|------------|---|--|
| Q097976006 | AA   | 5-8A-47 | VICTORIA A PAKROVSKY ET VIR | NOBLE ENERGY INC | 1/8+    | 890  | 590  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976005 | AA   | 5-8A-47 | MARJORIE B KIDD ET VIR      | NOBLE ENERGY INC | 1/8+    | 890  | 596  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q099899000 | BB   | 5-8A-46 | THOMAS DANIEL BLUE ET UX    | NOBLE ENERGY INC | 1/8+    | 898  | 584  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 931/43 Noble Energy Inc to HG Energy Appalachia LLC | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976007 | BB   | 5-8A-46 | CHARLES EDWIN BLU           | NOBLE ENERGY INC | 1/8+    | 890  | 316  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976006 | BB   | 5-8A-46 | VICTORIA A PAKROVSKY ET VIR | NOBLE ENERGY INC | 1/8+    | 890  | 590  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976005 | BB   | 5-8A-46 | MARJORIE B KIDD ET VIR      | NOBLE ENERGY INC | 1/8+    | 890  | 596  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q099899000 | CC   | 5-8A-49 | THOMAS DANIEL BLUE ET UX    | NOBLE ENERGY INC | 1/8+    | 898  | 584  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976007 | CC   | 5-8A-49 | CHARLES EDWIN BLU           | NOBLE ENERGY INC | 1/8+    | 890  | 316  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976006 | CC   | 5-8A-49 | VICTORIA A PAKROVSKY ET VIR | NOBLE ENERGY INC | 1/8+    | 890  | 590  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC   | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |



WW-6A1 Supplement

Operator's Well No. Bryan N - 6HM

| Lease No.  | Tags | Parcel  | Lessor                      | Lessee           | Royalty | Book | Page | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment  |  |
|------------|------|---------|-----------------------------|------------------|---------|------|------|------------|------------|------------|------------|------------|------------|------------|---|--|
| Q097976005 | CC   | 5-8A-49 | MARJORIE B KIDD ET VIR      | NOBLE ENERGY INC | 1/8+    | 890  | 596  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q099899000 | DD   | 5-8A-42 | THOMAS DANIEL BLUE ET UX    | NOBLE ENERGY INC | 1/8+    | 898  | 584  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976007 | DD   | 5-8A-42 | CHARLES EDWIN BLU           | NOBLE ENERGY INC | 1/8+    | 890  | 316  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976006 | DD   | 5-8A-42 | VICTORIA A PAKROVSKY ET VIR | NOBLE ENERGY INC | 1/8+    | 890  | 590  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q097976005 | DD   | 5-8A-42 | MARJORIE B KIDD ET VIR      | NOBLE ENERGY INC | 1/8+    | 890  | 596  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |
| Q078626017 | EE   | 5-8A-39 | SOUTHEASTERN GUIDE DOGS INC | NOBLE ENERGY INC | 1/8+    | 820  | 516  | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | 39/1 Noble Energy Inc to HG Energy Appalachia LLC | 988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC |





MICHAEL MORAN  
BRIGHTON RESOURCES  
3551 ELLSWORTH AVENUE, #1  
PITTSBURGH PA 15232-1707

BOOK 040 PAGE 0127

STATE OF WEST VIRGINIA §  
§  
COUNTY OF MARSHALL §

Marshall County  
Jan Pest, Clerk  
Instrument 162335  
08/16/2017 @ 12:08:49 PM  
ASSIGNMENTS  
Book 40 @ Page 127  
Pages Recorded 25  
Recording Cost \$ 33.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this day of AUGUST, 2017 (the "Effective Date"), by and between CHEVRON U.S.A. INC. (hereinafter "Assignor") and TR EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated the 1st day of August, 2017 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to those certain Oil and Gas Leases situated in Marshall County, West Virginia, as described in Exhibit "A", attached hereto and made a part hereof (hereinafter the "Leases"), less and except certain overriding royalty interests and exclusions; and

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases as described below, subject to certain overriding royalty interests and less and except certain exclusions.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and subject to the limited warranties, restrictions and conditions hereinafter mentioned, the parties hereto, intending to be legally bound, do covenant and agree as follows:

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon, except that Assignor excepts and reserves from this Assignment the following:

A. The Chevron ORRI previously conveyed to Assignor and as described in that certain Memorandum of Assignment of Oil and Gas Lease Interests dated November 6, 2012 by and between Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia, and

B. As to each of the Leases and all oil, gas, and associated hydrocarbons produced, saved and sold thereunder, an overriding royalty interest equal to the difference between 82% and the

RECEIVED  
Office of Oil and Gas

AUG 31 2018

WV Department of  
Environmental Protection

DPS LAND SERVICES CORP  
6000 TOWN CENTER BOULEVARD, SUITE 145  
CANDLERBURG, PA 15317-5041

**MEMORANDUM OF AGREEMENT**

This Memorandum of Agreement is entered into this 26<sup>th</sup> day of February, 2018, between TUG HILL OPERATING, LLC ("THQ"), a Texas limited liability company, whose address is 1320 S. University Blvd., Suite 500, Fort Worth, TX 76107 and HG Energy II APPALACHIA, LLC ("HG"), a Delaware limited liability company, whose address is 5260 Dupont Road, Parkersburg, WV 26101.

**PARTIES AND AGREEMENT REFERENCE:** THQ and HG entered into a letter agreement ("Letter Agreement") dated February 26, 2018 (the "Commencement Date") outlining pursuit of definitive agreements to allow THQ the right to permit, drill, extract, produce and market oil and gas from those certain oil and gas interests controlled by HG in Franklin District of Marshall County, West Virginia, as more fully described in Exhibit A attached hereto, made a part hereof, and incorporated herein by reference.

1. **TERM:** The rights granted in the Letter Agreement will terminate upon the earlier of (i) one hundred eighty (180) days from the Commencement Date, (ii) HG's revocation of the rights granted in the Letter Agreement, or (iii) the parties entering into the definitive agreement described in the Letter Agreement. Upon termination of the Letter Agreement under subsection (i) or (ii) of the immediately preceding sentence, THQ will record a surrender of this Memorandum and withdraw any related well work permit requests.

2. **MEMORANDUM FOR RECORDING PURPOSES ONLY:** This Memorandum is for recording purposes only and does not supplement or supersede the parties' respective rights set forth in the Letter Agreement or other agreements.

IN WITNESS WHEREOF, the parties have signed their names hereto as of the date first above written.

Tug Hill Operating, LLC

By: Douglas L. DeMartino  
Name: Douglas L. DeMartino  
Title: Attorney-in-Fact

HG Energy II Appalachia, LLC

By: E. A. Heas  
Its: V.P. of Land + Attorney in Fact

Prepared by Tug Hill Operating, LLC  
1320 S. University Dr., Suite 500, Fort Worth, TX 76107

Marshall County  
Jan Pest, Clerk  
Instrument 1437593  
03/12/2018 @ 03:12:57 PM  
AGREEMENT  
Book 962 @ Page 488  
Pages Recorded 3  
Recording Cost \$ 11.00

RECEIVED  
Office of Oil and Gas  
AUG 31 2018  
WV Department of  
Environmental Protection



MEMORANDUM OF OPERATING AGREEMENT AND FINANCING STATEMENT

This Memorandum of Operating Agreement and Financing Statement (hereinafter referred to as "Memorandum") is executed to be effective concurrently with that certain Operating Agreement (the "Operating Agreement") by and between TH Exploration, LLC, as Operator, and HG Energy II Appalachia, LLC and TH Exploration II, LLC, as Non-Operators, covering, among other things, the development and production of crude oil, natural gas and associated substances from the leases (hereinafter called the "Contract Area") described on Exhibit "A-1" and Exhibit "A-2" attached hereto and owned by Operator and Non-Operator in the respective percentages of shares indicated on Exhibit "A" to the Operating Agreement.

The Operating Agreement contains an Accounting Procedure, along with provisions giving the parties hereto mutual liens and security interests where one or more parties hereto are or may become Debtors to one or more other parties hereto. This Memorandum incorporates by reference all of the terms and conditions of the Operating Agreement, including but not limited to the lien and security interest provisions.

The purpose of this Memorandum is to place third parties on notice of the Operating Agreement, and to secure and perfect the mutual liens and security interests of the parties hereto.

The Operating Agreement specifically provides and the parties do hereby confirm and agree that:

1. The Operator shall conduct and direct and have full control of all operations on the Contract Area as permitted and required by, and within the limits of, the Operating Agreement.
2. The liability of the parties under the Operating Agreement shall be several, not joint or collective. Each party shall be responsible only for its obligations and shall be liable only for its proportionate share of costs.
3. Each Non-Operator grants to Operator a lien upon its oil and gas rights, oil and gas leases and mineral interests in the Contract Area, and a security interest in its share of oil and/or gas when extracted and its interest in all fixtures, inventory, personal property and equipment located on or used on the Contract Area and in all its contract rights and receivables related thereto and arising therefrom to secure payment of its present and future share of costs and expenses, together with interest thereon at the rate provided in the Accounting Procedure referred to above. To the extent that Operator has a security interest under the Uniform Commercial Code ("Code") of the state or states in which the Contract Area is located, Operator without prejudice and in addition to all other legal, equitable and contractual remedies which are expressly reserved, shall be entitled to exercise the rights and remedies of a secured party under the Code. The bringing of a suit and the obtaining of judgment by Operator for the secured indebtedness shall not be deemed an election of remedies or otherwise affect the rights or security interests for the payment thereof.
4. The Operator grants to Non-Operator a lien and security interest equivalent to that granted to Operator as described in Paragraph 3 above, to secure payment by Operator of its own share of costs and expenses when due.

RECEIVED  
Office of Oil and Gas  
AUG 31 2018  
WV Department of  
Environmental Protection



August 30, 2018

WVDEP Office of Oil & Gas  
Attn: Laura Adkins  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304-2345

Subject: **Permit Modification Request** for Bryan N-6HM API # 47-051-01977  
District; Marshall County, WV  
**Changes to Permit: Lateral extension**

Dear Laura:

As the result of a recent acreage trade, Tug Hill is requesting a modification to the above-mentioned permit that will allow us to extend the bottom hole location of this lateral. Enclosed please find the following:

- Revised WW-6B (approved by Jim Nicholson)
- Revised Mylar Well Plat (Approved by Jim Nicholson)
- Updated WW-6A1 Information

If you have any question or need any additional information please feel free to call me at 304-376-0111.  
Thank you for your consideration in this matter.

Sincerely,

A handwritten signature in blue ink that reads "Amy L. Miller".

Amy L. Miller  
Permitting Specialist – Appalachia Region

RECEIVED  
Office of Oil and Gas  
AUG 31 2018  
WV Department of  
Environmental Protection