



west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Friday, July 26, 2019
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for OLD CROW N-7HM
47-051-02239-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

A blue ink signature of James A. Martin, Chief, is written over the text.

Operator's Well Number: OLD CROW N-7HM
Farm Name: DONNA VIVIAN YOHO (TODAY)
U.S. WELL NUMBER: 47-051-02239-00-00
Horizontal 6A New Drill
Date Issued: 7/26/2019

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
10. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

PERMIT CONDITIONS

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.

WW-6B
(04/15)

API NO. 47-051
OPERATOR WELL NO. Old Crow N-7HM
Well Pad Name: Old Crow

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 Z
Operator ID County District Quadrangle

2) Operator's Well Number: Old Crow N-7HM Well Pad Name: Old Crow

3) Farm Name/Surface Owner: Donna Yoho Public Road Access: Rines Ridge Road (County Route 76)

4) Elevation, current ground: 1286' Elevation, proposed post-construction: 1264.99'

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

(b) If Gas Shallow Deep
Horizontal

Handwritten signature and date: 6/15/19

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6627' - 6574', thickness of 53' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6,727'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 18,041'

11) Proposed Horizontal Leg Length: 9,377.60'

12) Approximate Fresh Water Strata Depths: 70'; 981'

13) Method to Determine Fresh Water Depths: Use shallow offset wells to determine deepest freshwater, or determine using pre-drill tests, testing while drilling or petrophysical evaluation of resistivity.

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 890' and Pittsburgh Coal - 975'

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

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

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

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WW-6B
(04/15)

API NO. 47-051 -
OPERATOR WELL NO. Old Crow N-7HM
Well Pad Name: Old Crow

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 | 120' | 120' | 259ft^3(CTS) |
| Fresh Water | 13 3/8" | NEW | J55 | 54.5# | 1,080' | 1,080' | 1100ft^3(CTS) |
| Coal | 13 3/8" | NEW | J55 | 54.5# | 1,080' | 1,080' | 1100ft^3(CTS) |
| Intermediate | 9 5/8" | NEW | J55 | 36# | 3,041' | 3,041' | 1006ft^3(CTS) |
| Production | 5 1/2" | NEW | P110 | 20# | 18,041' | 18,041' | 4615ft^3(CTS) |
| Tubing | 2 3/8" | NEW | N80 | 4.7# | 8,208' | | |
| Liners | | | | | | | |

ju
6/5/19

| 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" | 17.5" | .33 | 2,740 | 2,192 | SEE #24 | 1.2 |
| Coal | 13 3/8" | 17.5" | .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 | 10,112 | SEE #24 | 1.17/1.19 |
| Tubing | 2 3/8" | | .19 | 11,200 | 8,960 | | |
| Liners | | | | | | | |

PACKERS

| | | | | |
|-------------|-----|--|--|-----------------------------------|
| Kind: | N/A | | | |
| Sizes: | N/A | | | |
| Depths Set: | N/A | | | RECEIVED Office of Oil and Gas |

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WW-6B
(10/14)

47 05 102239
API NO. 47-051 -
OPERATOR WELL NO. Old Crow N-7HM
Well Pad Name: Old Crow

June 15/19

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

Drill through the Marcellus tagging less than 100' from the top of the Onondaga to get depths and log data. Plug back to proposed kick off point. Drill the horizontal section to planned and proposed TD. Run casing and cement to surface. Run Bond Log from app. 60 deg to surface. Make clean out run and stimulate.

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

Well to completed with approximately 23,440,000 lb. proppant and 362,400 barrels of water.
Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 19.18 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.64 acres

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 attachment

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.

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*Note: Attach additional sheets as needed.

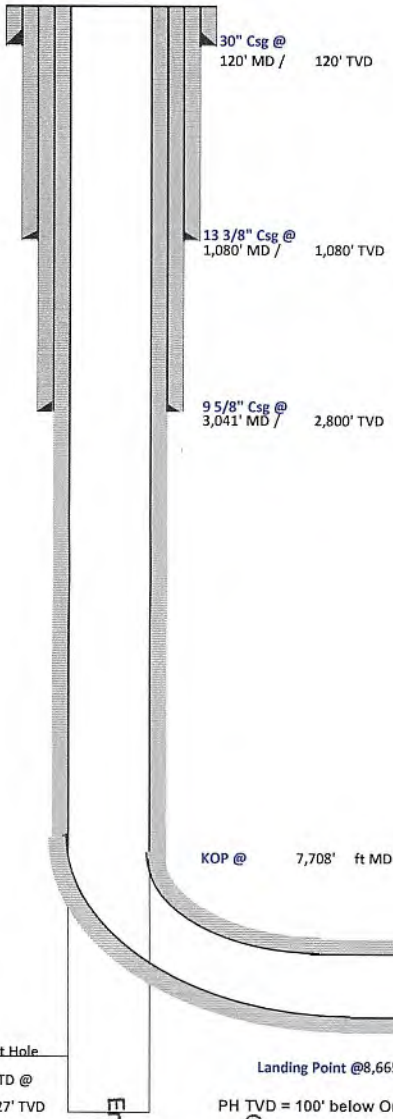


WELL NAME: Old Crow N-7HM
 STATE: WV COUNTY: Marshall
 DISTRICT: Franklin
 DF Elev: 1,265' GL Elev: 1,265'
 TD: 18,041'
 TH Latitude: 39.7784951
 TH Longitude: -80.76305068
 BH Latitude: 39.809022
 BH Longitude: 80.767737

| FORMATION TOPS | |
|---------------------|-----------|
| Formation | Depth TVD |
| Deepest Fresh Water | 981 |
| Sewickley Coal | 890 |
| Pittsburgh Coal | 975 |
| Big Lime | 2109 |
| Weir | 2463 |
| Berea | 2658 |
| Gordon | 3003 |
| Rhinestreet | 5968 |
| Geneseo/Burkett | 6474 |
| Tully | 6493 |
| Hamilton | 6528 |
| Marcellus | 6574 |
| Landing Depth | 6609 |
| Onondaga | 6627 |
| Pilot Hole Depth | 6727 |

| CASING SUMMARY | | | | | | | |
|----------------|----------------|---------------|------------|-------------|----------------|---------|---------------|
| Type | Hole Size (in) | Csg Size (in) | Depth (MD) | Depth (TVD) | Weight (lb/ft) | Grade | Top of Cement |
| Conductor | 36 | 30 | 120' | 120' | BW | BW | Surface |
| Surface | 17.5 | 13 3/8 | 1,080' | 1,080' | 54.5 | J55 | Surface |
| Intermediate 1 | 12 1/4 | 9 5/8 | 3,041' | 2,800' | 36 | J55 | Surface |
| Production | 8 7/8 x 8 3/4 | 5 1/2 | 18,041' | 6,445' | 20 | CYHP110 | Surface |

| CEMENT SUMMARY | | | | DRILLING DETAILS | |
|----------------|-------|-------|---------|------------------|---|
| | Sacks | Class | Density | Fluid Type | Centralizer Notes |
| Conductor | 338 | A | 15.6 | Air | None |
| Surface | 1,113 | A | 15.6 | Air | 3 Centralizers at equal distance |
| Intermediate 1 | 1,014 | A | 15 | Air | 1 Centralizer every other jt |
| Production | 4,236 | A | 14.5 | Air / SOBM | 1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc |



Jan 6/5/19

4705102239

Pilot Hole
 PH TD @
 6,727' TVD

Landing Point @8,665' MD / 6,609' TVD

PH TVD = 100' below Onondaga Top

Lateral TD @ 18,041' ft MD
 6,445' ft TVD

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Tug Hill Operating, LLC Casing and Cement Program

Old Crow N-7HM

Casing

| | String | Grade | Bit Size | Depth (Measured) | Cement Fill Up |
|--------------|---------|---------|---------------|------------------|----------------|
| Conductor | 30" | BW | 36" | 120' | CTS |
| Surface | 13 3/8" | J55 | 17 1/2" | 1,080' | CTS |
| Intermediate | 9 5/8" | J55 | 12 1/4" | 3,041' | CTS |
| Production | 5 1/2" | CYHP110 | 8 7/8 x 8 3/4 | 18,041' | 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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Well: Old Crow N-07 HM (slot C)
 Site: Old Crow Pad
 Project: Marshall County, West Virginia.
 Design: rev2
 SECTION DETAILS

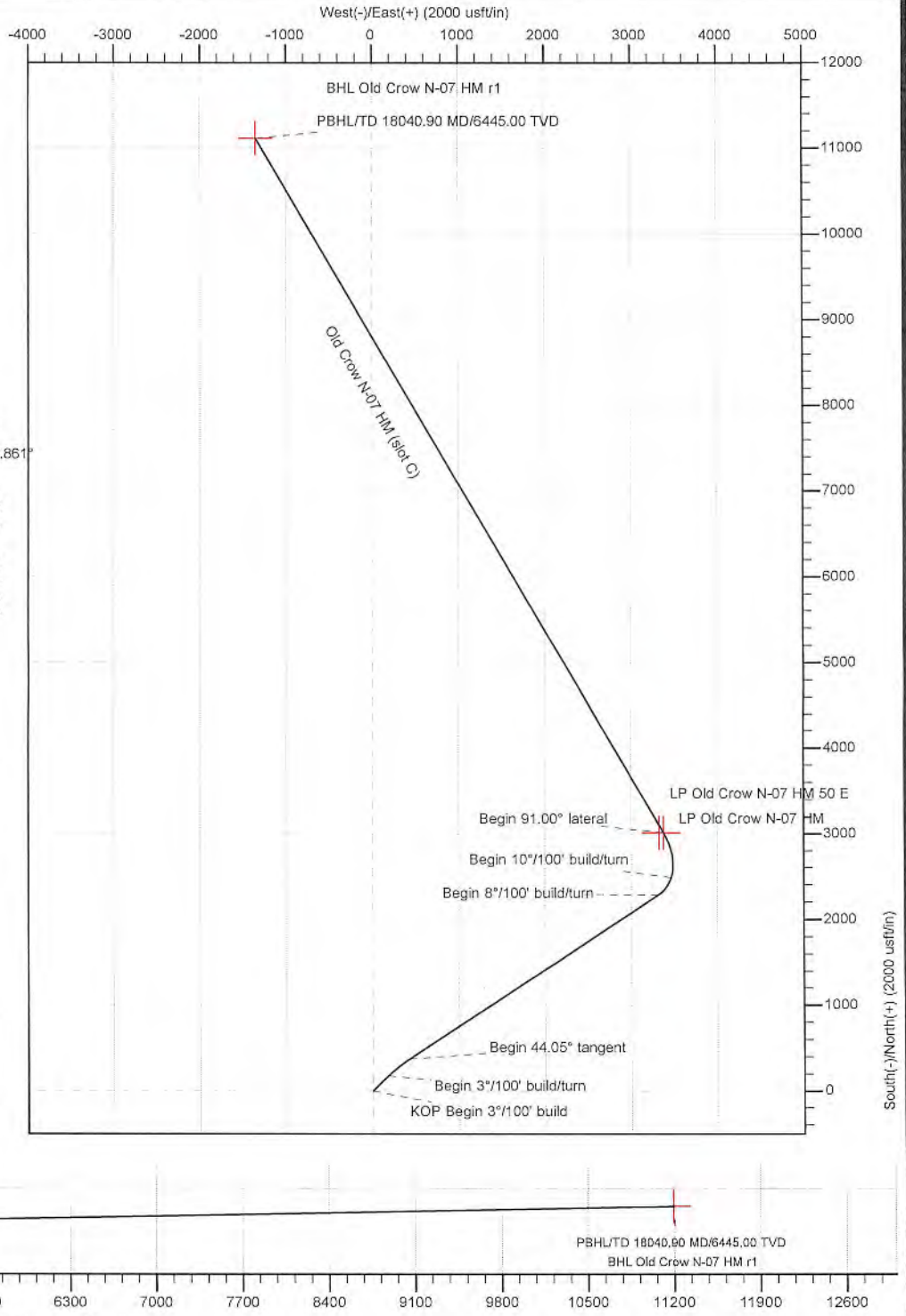
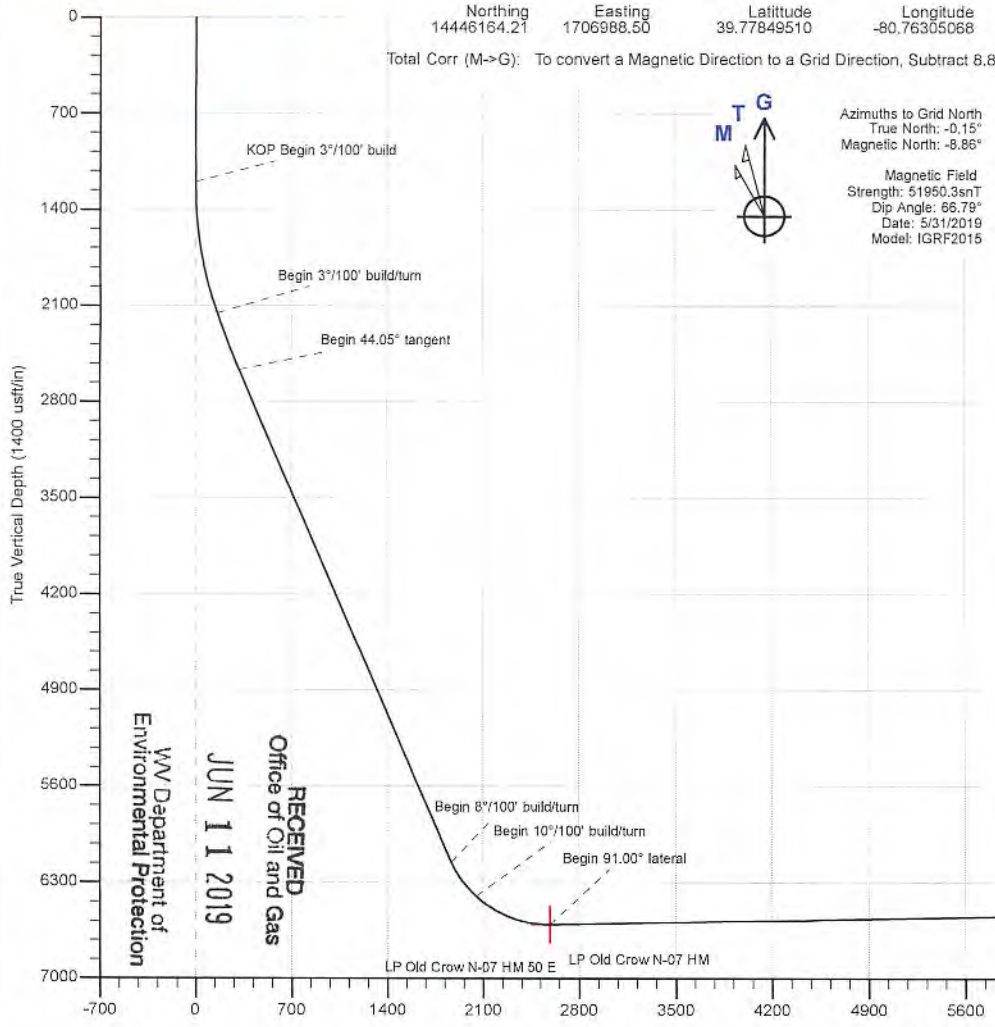
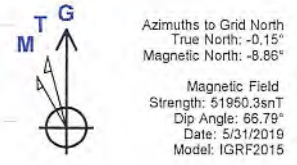
| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | Vsect | Annotation |
|-----|----------|-------|--------|---------|----------|----------|-------|---------|---------|---------------------------------|
| 1 | 1200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2 | 2200.00 | 0.00 | 0.00 | 1200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | KOP Begin 3°/100' build |
| 3 | 2720.68 | 30.00 | 45.00 | 2154.93 | 180.93 | 180.93 | 3.00 | 45.000 | 157.87 | Begin 3°/100' build/turn |
| 4 | 7708.29 | 44.05 | 56.54 | 2570.09 | 373.95 | 425.50 | 3.00 | 31.114 | 320.10 | Begin 44.05° tangent |
| 5 | 8081.70 | 44.05 | 56.54 | 6155.07 | 2285.60 | 3318.56 | 0.00 | 0.000 | 1870.12 | Begin 8°/100' build/turn |
| 6 | 8655.06 | 50.00 | 18.37 | 6400.67 | 2485.87 | 3486.74 | 8.00 | -91.688 | 2051.13 | Begin 10°/100' build/turn |
| 7 | 8655.06 | 91.00 | 329.73 | 6608.92 | 3015.59 | 3379.31 | 10.00 | -59.722 | 2587.52 | Begin 91.00° lateral |
| 8 | 18040.90 | 91.00 | 329.73 | 6445.00 | 11112.25 | -1345.48 | 0.00 | 0.000 | 1193.41 | PBHL/TD 18040.90 MD/6445.00 TVD |



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: GL @ 1265.00usft

Northing 14446164.21 Easting 1706988.50 Latitude 39.77849510 Longitude -80.76305088

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.86°



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Planning Report - Geographic

| | | | |
|-----------|---------------------------------|------------------------------|--------------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Old Crow N-07 HM (slot C) |
| Company: | Tug Hill Operating LLC | TVD Reference: | GL @ 1265.00usft |
| Project: | Marshall County, West Virginia. | MD Reference: | GL @ 1265.00usft |
| Site: | Old Crow Pad | North Reference: | Grid |
| Well: | Old Crow N-07 HM (slot C) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev2 | | |

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

| | | | | | |
|-----------------------|--------------|--------------|--------------------|-------------------|--------------|
| Site | Old Crow Pad | | | | |
| Site Position: | | Northing: | 14,446,179.89 usft | Latitude: | 39.77853828 |
| From: | Lat/Long | Easting: | 1,706,970.33 usft | Longitude: | -80.76311519 |
| Position Uncertainty: | 0.00 usft | Slot Radius: | 13-3/16 " | Grid Convergence: | 0.152 ° |

| | | | | | | |
|----------------------|---------------------------|-----------|---------------------|--------------------|---------------|---------------|
| Well | Old Crow N-07 HM (slot C) | | | | | |
| Well Position | +N/-S | 0.00 usft | Northing: | 14,446,164.21 usft | Latitude: | 39.77849510 |
| | +E/-W | 0.00 usft | Easting: | 1,706,988.50 usft | Longitude: | -80.76305068 |
| Position Uncertainty | | 0.00 usft | Wellhead Elevation: | | Ground Level: | 1,265.00 usft |

| | | | | | |
|-----------|---------------|-------------|-----------------|---------------|---------------------|
| Wellbore | Original Hole | | | | |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
| | IGRF2015 | 5/31/2019 | -8.709 | 66.794 | 51,950.27578972 |

| | | | | |
|-------------------|-------------------------|--------------|---------------|---------------|
| Design | rev2 | | | |
| Audit Notes: | | | | |
| Version: | Phase: | PLAN | Tie On Depth: | 0.00 |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |
| | 0.00 | 0.00 | 0.00 | 353.10 |

| | | | | |
|--------------------------|-----------------|--------------------------------|-----------|----------------|
| Plan Survey Tool Program | Date 5/24/2019 | | | |
| Depth From (usft) | Depth To (usft) | Survey (Wellbore) | Tool Name | Remarks |
| 1 | 0.00 | 18,040.90 rev2 (Original Hole) | MWD | MWD - Standard |

| Plan Sections | | | | | | | | | | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|------------------------|-----------------------|---------|--------|
| 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 | 0.000 | |
| 1,200.00 | 0.00 | 0.00 | 1,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | |
| 2,200.00 | 30.00 | 45.00 | 2,154.93 | 180.93 | 180.93 | 3.00 | 3.00 | 0.00 | 45.000 | |
| 2,720.68 | 44.05 | 56.54 | 2,570.09 | 373.95 | 425.50 | 3.00 | 2.70 | 2.22 | 31.114 | |
| 7,708.29 | 44.05 | 56.54 | 6,155.07 | 2,285.60 | 3,318.56 | 0.00 | 0.00 | 0.00 | 0.000 | |
| 8,061.70 | 50.00 | 18.37 | 6,400.67 | 2,485.87 | 3,466.74 | 8.00 | 1.68 | -10.80 | -91.698 | |
| 8,665.06 | 91.00 | 329.73 | 6,608.92 | 3,015.59 | 3,379.31 | 10.00 | 6.80 | -8.06 | -59.722 | |
| 18,040.90 | 91.00 | 329.73 | 6,445.00 | 11,112.25 | -1,345.48 | 0.00 | 0.00 | 0.00 | 0.000 | |

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BHL Old Crow N-07 F



Planning Report - Geographic

| | | | |
|-----------|---------------------------------|------------------------------|--------------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Old Crow N-07 HM (slot C) |
| Company: | Tug Hill Operating LLC | TVD Reference: | GL @ 1265.00usft |
| Project: | Marshall County, West Virginia. | MD Reference: | GL @ 1265.00usft |
| Site: | Old Crow Pad | North Reference: | Grid |
| Well: | Old Crow N-07 HM (slot C) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev2 | | |

| 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 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 900.00 | 0.00 | 0.00 | 900.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 1,000.00 | 0.00 | 0.00 | 1,000.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 1,100.00 | 0.00 | 0.00 | 1,100.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| 1,200.00 | 0.00 | 0.00 | 1,200.00 | 0.00 | 0.00 | 14,446,164.21 | 1,706,988.50 | 39.77849510 | -80.76305068 | |
| KOP Begin 3°/100' build | | | | | | | | | | |
| 1,300.00 | 3.00 | 45.00 | 1,299.95 | 1.85 | 1.85 | 14,446,166.06 | 1,706,990.35 | 39.77850017 | -80.76304408 | |
| 1,400.00 | 6.00 | 45.00 | 1,399.63 | 7.40 | 7.40 | 14,446,171.61 | 1,706,995.89 | 39.77851537 | -80.76302428 | |
| 1,500.00 | 9.00 | 45.00 | 1,498.77 | 16.63 | 16.63 | 14,446,180.84 | 1,707,005.12 | 39.77854064 | -80.76299135 | |
| 1,600.00 | 12.00 | 45.00 | 1,597.08 | 29.51 | 29.51 | 14,446,193.72 | 1,707,018.01 | 39.77857593 | -80.76294536 | |
| 1,700.00 | 15.00 | 45.00 | 1,694.31 | 46.02 | 46.02 | 14,446,210.23 | 1,707,034.51 | 39.77862114 | -80.76288646 | |
| 1,800.00 | 18.00 | 45.00 | 1,790.18 | 66.10 | 66.10 | 14,446,230.31 | 1,707,054.59 | 39.77867614 | -80.76281480 | |
| 1,900.00 | 21.00 | 45.00 | 1,884.43 | 89.70 | 89.70 | 14,446,253.91 | 1,707,078.19 | 39.77874078 | -80.76273058 | |
| 2,000.00 | 24.00 | 45.00 | 1,976.81 | 116.75 | 116.75 | 14,446,280.97 | 1,707,105.25 | 39.77881489 | -80.76263402 | |
| 2,100.00 | 27.00 | 45.00 | 2,067.06 | 147.19 | 147.19 | 14,446,311.41 | 1,707,135.69 | 39.77889826 | -80.76252539 | |
| 2,200.00 | 30.00 | 45.00 | 2,154.93 | 180.93 | 180.93 | 14,446,345.14 | 1,707,169.43 | 39.77899067 | -80.76240500 | |
| Begin 3°/100' build/turn | | | | | | | | | | |
| 2,300.00 | 32.60 | 47.88 | 2,240.37 | 216.68 | 218.60 | 14,446,380.90 | 1,707,207.09 | 39.77908859 | -80.76227059 | |
| 2,400.00 | 35.26 | 50.37 | 2,323.34 | 253.17 | 260.82 | 14,446,417.39 | 1,707,249.32 | 39.77918849 | -80.76211996 | |
| 2,500.00 | 37.96 | 52.55 | 2,403.60 | 290.30 | 307.48 | 14,446,454.51 | 1,707,295.98 | 39.77929009 | -80.76195353 | |
| 2,600.00 | 40.70 | 54.48 | 2,480.95 | 327.95 | 358.45 | 14,446,492.16 | 1,707,346.95 | 39.77939313 | -80.76177176 | |
| 2,700.00 | 43.47 | 56.21 | 2,555.16 | 366.03 | 413.59 | 14,446,530.25 | 1,707,402.09 | 39.77949732 | -80.76157513 | |
| 2,720.68 | 44.05 | 56.54 | 2,570.09 | 373.95 | 425.50 | 14,446,538.17 | 1,707,414.00 | 39.77951898 | -80.76153267 | |
| Begin 44.05° tangent | | | | | | | | | | |
| 2,800.00 | 44.05 | 56.54 | 2,627.11 | 404.35 | 471.51 | 14,446,568.57 | 1,707,460.01 | 39.77960213 | -80.76136861 | |
| 2,900.00 | 44.05 | 56.54 | 2,698.98 | 442.68 | 529.51 | 14,446,606.90 | 1,707,518.01 | 39.77970697 | -80.76116179 | |
| 3,000.00 | 44.05 | 56.54 | 2,770.86 | 481.01 | 587.52 | 14,446,645.22 | 1,707,576.02 | 39.77981180 | -80.76095497 | |
| 3,100.00 | 44.05 | 56.54 | 2,842.74 | 519.34 | 645.52 | 14,446,683.55 | 1,707,634.02 | 39.77991663 | -80.76074814 | |
| 3,200.00 | 44.05 | 56.54 | 2,914.62 | 557.67 | 703.53 | 14,446,721.88 | 1,707,692.03 | 39.78002147 | -80.76054132 | |
| 3,300.00 | 44.05 | 56.54 | 2,986.49 | 595.99 | 761.53 | 14,446,760.21 | 1,707,750.03 | 39.78012630 | -80.76033449 | |
| 3,400.00 | 44.05 | 56.54 | 3,058.37 | 634.32 | 819.54 | 14,446,798.54 | 1,707,808.04 | 39.78023113 | -80.76012767 | |
| 3,500.00 | 44.05 | 56.54 | 3,130.25 | 672.65 | 877.54 | 14,446,836.86 | 1,707,866.04 | 39.78033596 | -80.75992084 | |
| 3,600.00 | 44.05 | 56.54 | 3,202.13 | 710.98 | 935.55 | 14,446,875.19 | 1,707,924.05 | 39.78044079 | -80.75971401 | |
| 3,700.00 | 44.05 | 56.54 | 3,274.00 | 749.31 | 993.55 | 14,446,913.52 | 1,707,982.05 | 39.78054563 | -80.75950719 | |
| 3,800.00 | 44.05 | 56.54 | 3,345.88 | 787.63 | 1,051.56 | 14,446,951.85 | 1,708,040.06 | 39.78065046 | -80.75930036 | |
| 3,900.00 | 44.05 | 56.54 | 3,417.76 | 825.96 | 1,109.56 | 14,446,990.17 | 1,708,098.06 | 39.78075529 | -80.75909353 | |
| 4,000.00 | 44.05 | 56.54 | 3,489.64 | 864.29 | 1,167.57 | 14,447,028.50 | 1,708,156.07 | 39.78086012 | -80.75888670 | |
| 4,100.00 | 44.05 | 56.54 | 3,561.51 | 902.62 | 1,225.57 | 14,447,066.83 | 1,708,214.07 | 39.78096495 | -80.75867987 | |
| 4,200.00 | 44.05 | 56.54 | 3,633.39 | 940.94 | 1,283.58 | 14,447,105.16 | 1,708,272.08 | 39.78106978 | -80.75847304 | |
| 4,300.00 | 44.05 | 56.54 | 3,705.27 | 979.27 | 1,341.58 | 14,447,143.49 | 1,708,330.08 | 39.78117460 | -80.75826621 | |
| 4,400.00 | 44.05 | 56.54 | 3,777.15 | 1,017.60 | 1,399.59 | 14,447,181.81 | 1,708,388.09 | 39.78127943 | -80.75805937 | |
| 4,500.00 | 44.05 | 56.54 | 3,849.03 | 1,055.93 | 1,457.59 | 14,447,220.14 | 1,708,446.09 | 39.78138426 | -80.75785254 | |
| 4,600.00 | 44.05 | 56.54 | 3,920.90 | 1,094.26 | 1,515.60 | 14,447,258.47 | 1,708,504.10 | 39.78148909 | -80.75764571 | |
| 4,700.00 | 44.05 | 56.54 | 3,992.78 | 1,132.58 | 1,573.60 | 14,447,296.80 | 1,708,562.10 | 39.78159392 | -80.75743887 | |
| 4,800.00 | 44.05 | 56.54 | 4,064.66 | 1,170.91 | 1,631.61 | 14,447,335.12 | 1,708,620.11 | 39.78169875 | -80.75723204 | |
| 4,900.00 | 44.05 | 56.54 | 4,136.54 | 1,209.24 | 1,689.61 | 14,447,373.45 | 1,708,678.11 | 39.78180357 | -80.75702520 | |



Planning Report - Geographic

| | | | |
|-----------|---------------------------------|------------------------------|--------------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Old Crow N-07 HM (slot C) |
| Company: | Tug Hill Operating LLC | TVD Reference: | GL @ 1265.00usft |
| Project: | Marshall County, West Virginia. | MD Reference: | GL @ 1265.00usft |
| Site: | Old Crow Pad | North Reference: | Grid |
| Well: | Old Crow N-07 HM (slot C) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev2 | | |

| Planned Survey | | | | | | | | | | |
|----------------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 5,000.00 | 44.05 | 56.54 | 4,208.41 | 1,247.57 | 1,747.62 | 14,447,411.78 | 1,708,736.12 | 39.78190840 | -80.75681837 | |
| 5,100.00 | 44.05 | 56.54 | 4,280.29 | 1,285.90 | 1,805.62 | 14,447,450.11 | 1,708,794.12 | 39.78201322 | -80.75661153 | |
| 5,200.00 | 44.05 | 56.54 | 4,352.17 | 1,324.22 | 1,863.63 | 14,447,488.44 | 1,708,852.13 | 39.78211805 | -80.75640469 | |
| 5,300.00 | 44.05 | 56.54 | 4,424.05 | 1,362.55 | 1,921.63 | 14,447,526.76 | 1,708,910.13 | 39.78222287 | -80.75619786 | |
| 5,400.00 | 44.05 | 56.54 | 4,495.92 | 1,400.88 | 1,979.64 | 14,447,565.09 | 1,708,968.14 | 39.78232770 | -80.75599102 | |
| 5,500.00 | 44.05 | 56.54 | 4,567.80 | 1,439.21 | 2,037.64 | 14,447,603.42 | 1,709,026.14 | 39.78243252 | -80.75578418 | |
| 5,600.00 | 44.05 | 56.54 | 4,639.68 | 1,477.53 | 2,095.65 | 14,447,641.75 | 1,709,084.15 | 39.78253735 | -80.75557734 | |
| 5,700.00 | 44.05 | 56.54 | 4,711.56 | 1,515.86 | 2,153.65 | 14,447,680.08 | 1,709,142.15 | 39.78264217 | -80.75537050 | |
| 5,800.00 | 44.05 | 56.54 | 4,783.44 | 1,554.19 | 2,211.66 | 14,447,718.40 | 1,709,200.16 | 39.78274699 | -80.75516366 | |
| 5,900.00 | 44.05 | 56.54 | 4,855.31 | 1,592.52 | 2,269.66 | 14,447,756.73 | 1,709,258.16 | 39.78285182 | -80.75495682 | |
| 6,000.00 | 44.05 | 56.54 | 4,927.19 | 1,630.85 | 2,327.67 | 14,447,795.06 | 1,709,316.17 | 39.78295664 | -80.75474997 | |
| 6,100.00 | 44.05 | 56.54 | 4,999.07 | 1,669.17 | 2,385.67 | 14,447,833.39 | 1,709,374.17 | 39.78306146 | -80.75454313 | |
| 6,200.00 | 44.05 | 56.54 | 5,070.95 | 1,707.50 | 2,443.68 | 14,447,871.71 | 1,709,432.18 | 39.78316628 | -80.75433629 | |
| 6,300.00 | 44.05 | 56.54 | 5,142.82 | 1,745.83 | 2,501.68 | 14,447,910.04 | 1,709,490.18 | 39.78327110 | -80.75412944 | |
| 6,400.00 | 44.05 | 56.54 | 5,214.70 | 1,784.16 | 2,559.69 | 14,447,948.37 | 1,709,548.19 | 39.78337592 | -80.75392260 | |
| 6,500.00 | 44.05 | 56.54 | 5,286.58 | 1,822.48 | 2,617.69 | 14,447,986.70 | 1,709,606.19 | 39.78348074 | -80.75371575 | |
| 6,600.00 | 44.05 | 56.54 | 5,358.46 | 1,860.81 | 2,675.70 | 14,448,025.03 | 1,709,664.20 | 39.78358556 | -80.75350891 | |
| 6,700.00 | 44.05 | 56.54 | 5,430.33 | 1,899.14 | 2,733.70 | 14,448,063.35 | 1,709,722.20 | 39.78369038 | -80.75330206 | |
| 6,800.00 | 44.05 | 56.54 | 5,502.21 | 1,937.47 | 2,791.71 | 14,448,101.68 | 1,709,780.20 | 39.78379520 | -80.75309521 | |
| 6,900.00 | 44.05 | 56.54 | 5,574.09 | 1,975.80 | 2,849.71 | 14,448,140.01 | 1,709,838.21 | 39.78390002 | -80.75288837 | |
| 7,000.00 | 44.05 | 56.54 | 5,645.97 | 2,014.12 | 2,907.72 | 14,448,178.34 | 1,709,896.21 | 39.78400484 | -80.75268152 | |
| 7,100.00 | 44.05 | 56.54 | 5,717.85 | 2,052.45 | 2,965.72 | 14,448,216.66 | 1,709,954.22 | 39.78410966 | -80.75247467 | |
| 7,200.00 | 44.05 | 56.54 | 5,789.72 | 2,090.78 | 3,023.73 | 14,448,254.99 | 1,710,012.22 | 39.78421448 | -80.75226782 | |
| 7,300.00 | 44.05 | 56.54 | 5,861.60 | 2,129.11 | 3,081.73 | 14,448,293.32 | 1,710,070.23 | 39.78431930 | -80.75206097 | |
| 7,400.00 | 44.05 | 56.54 | 5,933.48 | 2,167.44 | 3,139.74 | 14,448,331.65 | 1,710,128.23 | 39.78442411 | -80.75185412 | |
| 7,500.00 | 44.05 | 56.54 | 6,005.36 | 2,205.76 | 3,197.74 | 14,448,369.98 | 1,710,186.24 | 39.78452893 | -80.75164727 | |
| 7,600.00 | 44.05 | 56.54 | 6,077.23 | 2,244.09 | 3,255.75 | 14,448,408.30 | 1,710,244.24 | 39.78463375 | -80.75144041 | |
| 7,700.00 | 44.05 | 56.54 | 6,149.11 | 2,282.42 | 3,313.75 | 14,448,446.63 | 1,710,302.25 | 39.78473856 | -80.75123356 | |
| 7,708.29 | 44.05 | 56.54 | 6,155.07 | 2,285.60 | 3,318.56 | 14,448,449.81 | 1,710,307.06 | 39.78474726 | -80.75121641 | |
| Begin 8°/100' build/turn | | | | | | | | | | |
| 7,800.00 | 44.31 | 46.02 | 6,220.93 | 2,325.47 | 3,368.28 | 14,448,489.68 | 1,710,356.77 | 39.78485638 | -80.75103905 | |
| 7,900.00 | 45.68 | 34.86 | 6,291.75 | 2,379.17 | 3,413.93 | 14,448,543.38 | 1,710,402.43 | 39.78500350 | -80.75087601 | |
| 8,000.00 | 48.08 | 24.39 | 6,360.20 | 2,442.51 | 3,449.80 | 14,448,606.72 | 1,710,438.30 | 39.78517718 | -80.75074770 | |
| 8,061.70 | 50.00 | 18.37 | 6,400.67 | 2,485.87 | 3,466.74 | 14,448,650.08 | 1,710,455.24 | 39.78529613 | -80.75068697 | |
| Begin 10°/100' build/turn | | | | | | | | | | |
| 8,100.00 | 52.01 | 14.17 | 6,424.78 | 2,514.43 | 3,475.06 | 14,448,678.65 | 1,710,463.56 | 39.78537451 | -80.75065707 | |
| 8,200.00 | 57.87 | 4.26 | 6,482.29 | 2,595.07 | 3,487.89 | 14,448,759.28 | 1,710,476.38 | 39.78559586 | -80.75061061 | |
| 8,300.00 | 64.41 | 355.61 | 6,530.60 | 2,682.48 | 3,487.58 | 14,448,846.69 | 1,710,476.08 | 39.78583591 | -80.75061084 | |
| 8,400.00 | 71.40 | 347.89 | 6,568.24 | 2,774.01 | 3,474.15 | 14,448,938.22 | 1,710,462.65 | 39.78608738 | -80.75065773 | |
| 8,500.00 | 78.68 | 340.79 | 6,594.07 | 2,866.88 | 3,448.01 | 14,449,031.09 | 1,710,436.50 | 39.78634262 | -80.75074988 | |
| 8,600.00 | 86.13 | 334.04 | 6,607.29 | 2,958.26 | 3,409.94 | 14,449,122.47 | 1,710,398.44 | 39.78659387 | -80.75088447 | |
| 8,665.06 | 91.00 | 329.73 | 6,608.92 | 3,015.59 | 3,379.31 | 14,449,179.80 | 1,710,367.81 | 39.78675155 | -80.75099294 | |
| Begin 91.00° lateral | | | | | | | | | | |
| 8,700.00 | 91.00 | 329.73 | 6,608.31 | 3,045.77 | 3,361.70 | 14,449,209.98 | 1,710,350.20 | 39.78683456 | -80.75105532 | |
| 8,800.00 | 91.00 | 329.73 | 6,606.56 | 3,132.12 | 3,311.31 | 14,449,296.34 | 1,710,299.81 | 39.78707210 | -80.75123385 | |
| 8,900.00 | 91.00 | 329.73 | 6,604.81 | 3,218.48 | 3,260.92 | 14,449,382.69 | 1,710,249.41 | 39.78730964 | -80.75141238 | |
| 9,000.00 | 91.00 | 329.73 | 6,603.06 | 3,304.84 | 3,210.52 | 14,449,469.05 | 1,710,199.02 | 39.78754719 | -80.75159092 | |
| 9,100.00 | 91.00 | 329.73 | 6,601.32 | 3,391.19 | 3,160.13 | 14,449,555.41 | 1,710,148.63 | 39.78778473 | -80.75176945 | |
| 9,200.00 | 91.00 | 329.73 | 6,599.57 | 3,477.55 | 3,109.74 | 14,449,641.76 | 1,710,098.23 | 39.78802227 | -80.75194799 | |
| 9,300.00 | 91.00 | 329.73 | 6,597.82 | 3,563.91 | 3,059.34 | 14,449,728.12 | 1,710,047.84 | 39.78825981 | -80.75212652 | |
| 9,400.00 | 91.00 | 329.73 | 6,596.07 | 3,650.26 | 3,008.95 | 14,449,814.48 | 1,709,997.45 | 39.78849735 | -80.75230506 | |
| 9,500.00 | 91.00 | 329.73 | 6,594.32 | 3,736.62 | 2,958.56 | 14,449,900.83 | 1,709,947.05 | 39.78873489 | -80.75248360 | |
| 9,600.00 | 91.00 | 329.73 | 6,592.57 | 3,822.98 | 2,908.16 | 14,449,987.19 | 1,709,896.65 | 39.78897243 | -80.75266214 | |
| 9,700.00 | 91.00 | 329.73 | 6,590.83 | 3,909.33 | 2,857.77 | 14,450,073.55 | 1,709,846.25 | 39.78920997 | -80.75284069 | |

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Office of Oil and Gas
JUN 11 2019
WV Department of
Natural Protection



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia.
 Site: Old Crow Pad
 Well: Old Crow N-07 HM (slot C)
 Wellbore: Original Hole
 Design: rev2

Local Co-ordinate Reference: Well Old Crow N-07 HM (slot C)
 TVD Reference: GL @ 1265.00usft
 MD Reference: GL @ 1265.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

RECEIVED
Office of Oil and Gas

JUN 11 2019

Planned Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 9,800.00 | 91.00 | 329.73 | 6,589.08 | 3,995.69 | 2,807.38 | 14,450,159.90 | 1,709,795.87 | 39.78944752 | -80.75301923 |
| 9,900.00 | 91.00 | 329.73 | 6,587.33 | 4,082.05 | 2,756.98 | 14,450,246.26 | 1,709,745.48 | 39.78968506 | -80.75319777 |
| 10,000.00 | 91.00 | 329.73 | 6,585.58 | 4,168.40 | 2,706.59 | 14,450,332.62 | 1,709,695.09 | 39.78992259 | -80.75337632 |
| 10,100.00 | 91.00 | 329.73 | 6,583.83 | 4,254.76 | 2,656.20 | 14,450,418.97 | 1,709,644.69 | 39.79016013 | -80.75355487 |
| 10,200.00 | 91.00 | 329.73 | 6,582.08 | 4,341.12 | 2,605.81 | 14,450,505.33 | 1,709,594.30 | 39.79039767 | -80.75373341 |
| 10,300.00 | 91.00 | 329.73 | 6,580.34 | 4,427.47 | 2,555.41 | 14,450,591.69 | 1,709,543.91 | 39.79063521 | -80.75391196 |
| 10,400.00 | 91.00 | 329.73 | 6,578.59 | 4,513.83 | 2,505.02 | 14,450,678.04 | 1,709,493.51 | 39.79087275 | -80.75409051 |
| 10,500.00 | 91.00 | 329.73 | 6,576.84 | 4,600.19 | 2,454.63 | 14,450,764.40 | 1,709,443.12 | 39.79111029 | -80.75426906 |
| 10,600.00 | 91.00 | 329.73 | 6,575.09 | 4,686.54 | 2,404.23 | 14,450,850.76 | 1,709,392.73 | 39.79134783 | -80.75444762 |
| 10,700.00 | 91.00 | 329.73 | 6,573.34 | 4,772.90 | 2,353.84 | 14,450,937.11 | 1,709,342.33 | 39.79158536 | -80.75462617 |
| 10,800.00 | 91.00 | 329.73 | 6,571.59 | 4,859.26 | 2,303.45 | 14,451,023.47 | 1,709,291.94 | 39.79182290 | -80.75480473 |
| 10,900.00 | 91.00 | 329.73 | 6,569.85 | 4,945.61 | 2,253.05 | 14,451,109.83 | 1,709,241.55 | 39.79206044 | -80.75498328 |
| 11,000.00 | 91.00 | 329.73 | 6,568.10 | 5,031.97 | 2,202.66 | 14,451,196.18 | 1,709,191.16 | 39.79229798 | -80.75516184 |
| 11,100.00 | 91.00 | 329.73 | 6,566.35 | 5,118.33 | 2,152.27 | 14,451,282.54 | 1,709,140.76 | 39.79253551 | -80.75534040 |
| 11,200.00 | 91.00 | 329.73 | 6,564.60 | 5,204.68 | 2,101.87 | 14,451,368.90 | 1,709,090.37 | 39.79277305 | -80.75551896 |
| 11,300.00 | 91.00 | 329.73 | 6,562.85 | 5,291.04 | 2,051.48 | 14,451,455.25 | 1,709,039.98 | 39.79301059 | -80.75569752 |
| 11,400.00 | 91.00 | 329.73 | 6,561.10 | 5,377.39 | 2,001.09 | 14,451,541.61 | 1,708,989.58 | 39.79324812 | -80.75587609 |
| 11,500.00 | 91.00 | 329.73 | 6,559.36 | 5,463.75 | 1,950.69 | 14,451,627.96 | 1,708,939.19 | 39.79348566 | -80.75605465 |
| 11,600.00 | 91.00 | 329.73 | 6,557.61 | 5,550.11 | 1,900.30 | 14,451,714.32 | 1,708,888.80 | 39.79372319 | -80.75623321 |
| 11,700.00 | 91.00 | 329.73 | 6,555.86 | 5,636.46 | 1,849.91 | 14,451,800.68 | 1,708,838.40 | 39.79396073 | -80.75641178 |
| 11,800.00 | 91.00 | 329.73 | 6,554.11 | 5,722.82 | 1,799.51 | 14,451,887.03 | 1,708,788.01 | 39.79419826 | -80.75659035 |
| 11,900.00 | 91.00 | 329.73 | 6,552.36 | 5,809.18 | 1,749.12 | 14,451,973.39 | 1,708,737.62 | 39.79443580 | -80.75676892 |
| 12,000.00 | 91.00 | 329.73 | 6,550.61 | 5,895.53 | 1,698.73 | 14,452,059.75 | 1,708,687.22 | 39.79467333 | -80.75694749 |
| 12,100.00 | 91.00 | 329.73 | 6,548.87 | 5,981.89 | 1,648.33 | 14,452,146.10 | 1,708,636.83 | 39.79491086 | -80.75712606 |
| 12,200.00 | 91.00 | 329.73 | 6,547.12 | 6,068.25 | 1,597.94 | 14,452,232.46 | 1,708,586.44 | 39.79514840 | -80.75730463 |
| 12,300.00 | 91.00 | 329.73 | 6,545.37 | 6,154.60 | 1,547.55 | 14,452,318.82 | 1,708,536.04 | 39.79538593 | -80.75748321 |
| 12,400.00 | 91.00 | 329.73 | 6,543.62 | 6,240.96 | 1,497.15 | 14,452,405.17 | 1,708,485.65 | 39.79562346 | -80.75766178 |
| 12,500.00 | 91.00 | 329.73 | 6,541.87 | 6,327.32 | 1,446.76 | 14,452,491.53 | 1,708,435.26 | 39.79586100 | -80.75784036 |
| 12,600.00 | 91.00 | 329.73 | 6,540.12 | 6,413.67 | 1,396.37 | 14,452,577.89 | 1,708,384.86 | 39.79609853 | -80.75801893 |
| 12,700.00 | 91.00 | 329.73 | 6,538.38 | 6,500.03 | 1,345.97 | 14,452,664.24 | 1,708,334.47 | 39.79633606 | -80.75819751 |
| 12,800.00 | 91.00 | 329.73 | 6,536.63 | 6,586.39 | 1,295.58 | 14,452,750.60 | 1,708,284.08 | 39.79657359 | -80.75837609 |
| 12,900.00 | 91.00 | 329.73 | 6,534.88 | 6,672.74 | 1,245.19 | 14,452,836.96 | 1,708,233.68 | 39.79681112 | -80.75855467 |
| 13,000.00 | 91.00 | 329.73 | 6,533.13 | 6,759.10 | 1,194.79 | 14,452,923.31 | 1,708,183.29 | 39.79704866 | -80.75873326 |
| 13,100.00 | 91.00 | 329.73 | 6,531.38 | 6,845.46 | 1,144.40 | 14,453,009.67 | 1,708,132.90 | 39.79728619 | -80.75891184 |
| 13,200.00 | 91.00 | 329.73 | 6,529.63 | 6,931.81 | 1,094.01 | 14,453,096.03 | 1,708,082.50 | 39.79752372 | -80.75909042 |
| 13,300.00 | 91.00 | 329.73 | 6,527.89 | 7,018.17 | 1,043.61 | 14,453,182.38 | 1,708,032.11 | 39.79776125 | -80.75926901 |
| 13,400.00 | 91.00 | 329.73 | 6,526.14 | 7,104.53 | 993.22 | 14,453,268.74 | 1,707,981.72 | 39.79799878 | -80.75944760 |
| 13,500.00 | 91.00 | 329.73 | 6,524.39 | 7,190.88 | 942.83 | 14,453,355.10 | 1,707,931.32 | 39.79823631 | -80.75962619 |
| 13,600.00 | 91.00 | 329.73 | 6,522.64 | 7,277.24 | 892.43 | 14,453,441.45 | 1,707,880.93 | 39.79847384 | -80.75980478 |
| 13,700.00 | 91.00 | 329.73 | 6,520.89 | 7,363.60 | 842.04 | 14,453,527.81 | 1,707,830.54 | 39.79871137 | -80.75998337 |
| 13,800.00 | 91.00 | 329.73 | 6,519.14 | 7,449.95 | 791.65 | 14,453,614.17 | 1,707,780.14 | 39.79894890 | -80.76016196 |
| 13,900.00 | 91.00 | 329.73 | 6,517.40 | 7,536.31 | 741.25 | 14,453,700.52 | 1,707,729.75 | 39.79918642 | -80.76034055 |
| 14,000.00 | 91.00 | 329.73 | 6,515.65 | 7,622.67 | 690.86 | 14,453,786.88 | 1,707,679.36 | 39.79942395 | -80.76051915 |
| 14,100.00 | 91.00 | 329.73 | 6,513.90 | 7,709.02 | 640.47 | 14,453,873.24 | 1,707,628.96 | 39.79966148 | -80.76069774 |
| 14,200.00 | 91.00 | 329.73 | 6,512.15 | 7,795.38 | 590.07 | 14,453,959.59 | 1,707,578.57 | 39.79989901 | -80.76087634 |
| 14,300.00 | 91.00 | 329.73 | 6,510.40 | 7,881.74 | 539.68 | 14,454,045.95 | 1,707,528.18 | 39.80013654 | -80.76105494 |
| 14,400.00 | 91.00 | 329.73 | 6,508.65 | 7,968.09 | 489.29 | 14,454,132.31 | 1,707,477.78 | 39.80037406 | -80.76123354 |
| 14,500.00 | 91.00 | 329.73 | 6,506.91 | 8,054.45 | 438.89 | 14,454,218.66 | 1,707,427.39 | 39.80061159 | -80.76141214 |
| 14,600.00 | 91.00 | 329.73 | 6,505.16 | 8,140.81 | 388.50 | 14,454,305.02 | 1,707,377.00 | 39.80084912 | -80.76159074 |
| 14,700.00 | 91.00 | 329.73 | 6,503.41 | 8,227.16 | 338.11 | 14,454,391.38 | 1,707,326.60 | 39.80108664 | -80.76176934 |
| 14,800.00 | 91.00 | 329.73 | 6,501.66 | 8,313.52 | 287.71 | 14,454,477.73 | 1,707,276.21 | 39.80132417 | -80.76194795 |
| 14,900.00 | 91.00 | 329.73 | 6,499.91 | 8,399.88 | 237.32 | 14,454,564.09 | 1,707,225.82 | 39.80156170 | -80.76212655 |
| 15,000.00 | 91.00 | 329.73 | 6,498.16 | 8,486.23 | 186.93 | 14,454,650.45 | 1,707,175.42 | 39.80179922 | -80.76230516 |
| 15,100.00 | 91.00 | 329.73 | 6,496.42 | 8,572.59 | 136.53 | 14,454,736.80 | 1,707,125.03 | 39.80203675 | -80.76248377 |
| 15,200.00 | 91.00 | 329.73 | 6,494.67 | 8,658.95 | 86.14 | 14,454,823.16 | 1,707,074.64 | 39.80227427 | -80.76266238 |



Planning Report - Geographic

| | | | |
|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Old Crow N-07 HM (slot C) |
| Company: | Tug Hill Operating LLC | TVD Reference: | GL @ 1265.00usft |
| Project: | Marshall County, West Virginia. | MD Reference: | GL @ 1265.00usft |
| Site: | Old Crow Pad | North Reference: | Grid |
| Well: | Old Crow N-07 HM (slot C) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev2 | | |

| Planned Survey | | | | | | | | | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
| 15,300.00 | 91.00 | 329.73 | 6,492.92 | 8,745.30 | 35.75 | 14,454,909.52 | 1,707,024.24 | 39.80251180 | -80.76284099 |
| 15,400.00 | 91.00 | 329.73 | 6,491.17 | 8,831.66 | -14.65 | 14,454,995.87 | 1,706,973.85 | 39.80274932 | -80.76301960 |
| 15,500.00 | 91.00 | 329.73 | 6,489.42 | 8,918.02 | -65.04 | 14,455,082.23 | 1,706,923.46 | 39.80298685 | -80.76319821 |
| 15,600.00 | 91.00 | 329.73 | 6,487.67 | 9,004.37 | -115.43 | 14,455,168.59 | 1,706,873.06 | 39.80322437 | -80.76337683 |
| 15,700.00 | 91.00 | 329.73 | 6,485.93 | 9,090.73 | -165.83 | 14,455,254.94 | 1,706,822.67 | 39.80346189 | -80.76355544 |
| 15,800.00 | 91.00 | 329.73 | 6,484.18 | 9,177.09 | -216.22 | 14,455,341.30 | 1,706,772.28 | 39.80369942 | -80.76373406 |
| 15,900.00 | 91.00 | 329.73 | 6,482.43 | 9,263.44 | -266.61 | 14,455,427.65 | 1,706,721.88 | 39.80393694 | -80.76391268 |
| 16,000.00 | 91.00 | 329.73 | 6,480.68 | 9,349.80 | -317.01 | 14,455,514.01 | 1,706,671.49 | 39.80417446 | -80.76409130 |
| 16,100.00 | 91.00 | 329.73 | 6,478.93 | 9,436.15 | -367.40 | 14,455,600.37 | 1,706,621.10 | 39.80441199 | -80.76426992 |
| 16,200.00 | 91.00 | 329.73 | 6,477.18 | 9,522.51 | -417.79 | 14,455,686.72 | 1,706,570.70 | 39.80464951 | -80.76444854 |
| 16,300.00 | 91.00 | 329.73 | 6,475.44 | 9,608.87 | -468.19 | 14,455,773.08 | 1,706,520.31 | 39.80488703 | -80.76462716 |
| 16,400.00 | 91.00 | 329.73 | 6,473.69 | 9,695.22 | -518.58 | 14,455,859.44 | 1,706,469.92 | 39.80512455 | -80.76480579 |
| 16,500.00 | 91.00 | 329.73 | 6,471.94 | 9,781.58 | -568.97 | 14,455,945.79 | 1,706,419.52 | 39.80536207 | -80.76498441 |
| 16,600.00 | 91.00 | 329.73 | 6,470.19 | 9,867.94 | -619.36 | 14,456,032.15 | 1,706,369.13 | 39.80559959 | -80.76516304 |
| 16,700.00 | 91.00 | 329.73 | 6,468.44 | 9,954.29 | -669.76 | 14,456,118.51 | 1,706,318.74 | 39.80583711 | -80.76534167 |
| 16,800.00 | 91.00 | 329.73 | 6,466.70 | 10,040.65 | -720.15 | 14,456,204.86 | 1,706,268.34 | 39.80607464 | -80.76552029 |
| 16,900.00 | 91.00 | 329.73 | 6,464.95 | 10,127.01 | -770.54 | 14,456,291.22 | 1,706,217.95 | 39.80631216 | -80.76569892 |
| 17,000.00 | 91.00 | 329.73 | 6,463.20 | 10,213.36 | -820.94 | 14,456,377.58 | 1,706,167.56 | 39.80654968 | -80.76587756 |
| 17,100.00 | 91.00 | 329.73 | 6,461.45 | 10,299.72 | -871.33 | 14,456,463.93 | 1,706,117.16 | 39.80678720 | -80.76605619 |
| 17,200.00 | 91.00 | 329.73 | 6,459.70 | 10,386.08 | -921.72 | 14,456,550.29 | 1,706,066.77 | 39.80702471 | -80.76623482 |
| 17,300.00 | 91.00 | 329.73 | 6,457.95 | 10,472.43 | -972.12 | 14,456,636.65 | 1,706,016.38 | 39.80726223 | -80.76641346 |
| 17,400.00 | 91.00 | 329.73 | 6,456.21 | 10,558.79 | -1,022.51 | 14,456,723.00 | 1,705,965.99 | 39.80749975 | -80.76659209 |
| 17,500.00 | 91.00 | 329.73 | 6,454.46 | 10,645.15 | -1,072.90 | 14,456,809.36 | 1,705,915.59 | 39.80773727 | -80.76677073 |
| 17,600.00 | 91.00 | 329.73 | 6,452.71 | 10,731.50 | -1,123.30 | 14,456,895.72 | 1,705,865.20 | 39.80797479 | -80.76694937 |
| 17,700.00 | 91.00 | 329.73 | 6,450.96 | 10,817.86 | -1,173.69 | 14,456,982.07 | 1,705,814.81 | 39.80821231 | -80.76712801 |
| 17,800.00 | 91.00 | 329.73 | 6,449.21 | 10,904.22 | -1,224.08 | 14,457,068.43 | 1,705,764.41 | 39.80844983 | -80.76730665 |
| 17,900.00 | 91.00 | 329.73 | 6,447.46 | 10,990.57 | -1,274.48 | 14,457,154.79 | 1,705,714.02 | 39.80868734 | -80.76748529 |
| 18,000.00 | 91.00 | 329.73 | 6,445.72 | 11,076.93 | -1,324.87 | 14,457,241.14 | 1,705,663.63 | 39.80892486 | -80.76766394 |
| 18,040.90 | 91.00 | 329.73 | 6,445.00 | 11,112.25 | -1,345.48 | 14,457,276.46 | 1,705,643.02 | 39.80902200 | -80.76773700 |

PBHL/TD 18040.90 MD/6445.00 TVD

| Design Targets | | | | | | | | | |
|---|---------------|--------------|------------|--------------|--------------|-----------------|----------------|-------------|--------------|
| Target Name | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude | Longitude |
| BHL Old Crow N-07 HM - hit/miss target - Shape - Point | 0.00 | 0.00 | 6,445.00 | 11,112.25 | -1,345.48 | 14,457,276.46 | 1,705,643.02 | 39.80902200 | -80.76773700 |
| LP Old Crow N-07 HM 5 - plan misses target center by 0.28usft at 8664.98usft MD (6608.92 TVD, 3015.53 N, 3379.35 E) - Point | 0.00 | 0.00 | 6,609.00 | 3,015.40 | 3,379.11 | 14,449,179.61 | 1,710,367.61 | 39.78675102 | -80.75099366 |
| LP Old Crow N-07 HM - plan misses target center by 43.46usft at 8690.19usft MD (6608.48 TVD, 3037.29 N, 3366.65 E) - Point | 0.00 | 0.01 | 6,609.00 | 3,015.40 | 3,329.11 | 14,449,179.61 | 1,710,317.60 | 39.78675140 | -80.75117166 |

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Planning Report - Geographic

| | | | |
|-----------|---------------------------------|------------------------------|--------------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Old Crow N-07 HM (slot C) |
| Company: | Tug Hill Operating LLC | TVD Reference: | GL @ 1265.00usft |
| Project: | Marshall County, West Virginia. | MD Reference: | GL @ 1265.00usft |
| Site: | Old Crow Pad | North Reference: | Grid |
| Well: | Old Crow N-07 HM (slot C) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev2 | | |

| Plan Annotations | | | | |
|-----------------------|-----------------------|-------------------|--------------|---------------------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates | | Comment |
| | | +N/-S (usft) | +E/-W (usft) | |
| 1,200.00 | 1,200.00 | 0.00 | 0.00 | KOP Begin 3°/100' build |
| 2,200.00 | 2,154.93 | 180.93 | 180.93 | Begin 3°/100' build/turn |
| 2,720.68 | 2,570.09 | 373.95 | 425.50 | Begin 44.05° tangent |
| 7,708.29 | 6,155.07 | 2,285.60 | 3,318.56 | Begin 8°/100' build/turn |
| 8,061.70 | 6,400.67 | 2,485.87 | 3,466.74 | Begin 10°/100' build/turn |
| 8,665.06 | 6,608.92 | 3,015.59 | 3,379.31 | Begin 91.00° lateral |
| 18,040.90 | 6,445.00 | 11,112.25 | -1,345.48 | PBHL/TD 18040.90 MD/6445.00 TVD |

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API Number 47 - 051 - _____
Operator's Well No. Old Crow N-7HM

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) Fish Creek Quadrangle Powhatan Point 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: AST Tanks with proper containment will be used for staging fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes No If so, what ml.? AST Tanks will be used with proper contain

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number UIC 2459, UIC 965, UIC 359, UIC 2D0732540, UIC 2D0732523)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Will closed loop system be used? If so, describe: Yes - For Vertical and Horizontal Drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Base

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings to be disposed of in a Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1388426)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature James A Pancake

Company Official (Typed Name) James Pancake

Company Official Title Vice President - Geoscience

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JUN 11 2019

WV Department of
Environmental Protection

Subscribed and sworn before me this 4 day of JUNE, 20 19

[Signature]

Notary Public

My commission expires 6-30-2023

Commonwealth of Pennsylvania - Notary Seal
MATTHEW W REESE - Notary Public
Washington County
My Commission Expires Jun 30, 2023
Commission Number 1262930

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 19.18 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

| Temporary | | Permanent | |
|-----------------|----------|---------------|----------|
| Seed Type | lbs/acre | Seed Type | lbs/acre |
| Annual Ryegrass | 40 | Orchard Grass | 12 |
| Spring Oats | 96 | Ladino | 3 |
| | | White Clover | 2 |

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jan Anderson*

Comments: _____

Title: Oil and Gas Inspector

Date: 6/5/19

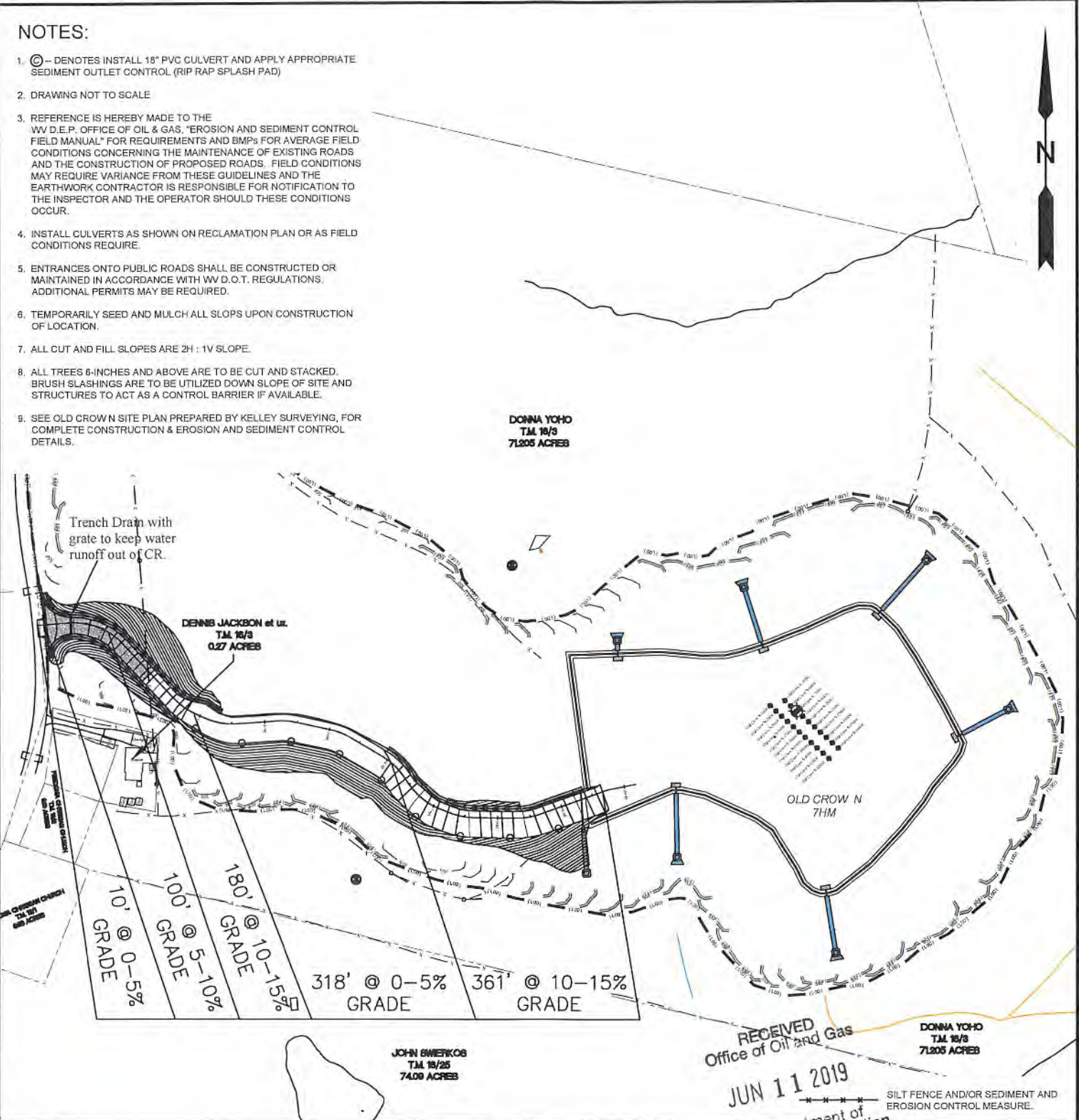
Field Reviewed? () Yes () No

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PROPOSED OLD CROW N - 7HM

NOTES:

1. Ⓞ - DENOTES INSTALL 18" PVC CULVERT AND APPLY APPROPRIATE SEDIMENT OUTLET CONTROL (RIP RAP SPLASH PAD)
2. DRAWING NOT TO SCALE
3. REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.
4. INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.
5. ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.
6. TEMPORARILY SEED AND MULCH ALL SLOPS UPON CONSTRUCTION OF LOCATION.
7. ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.
8. ALL TREES 8-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO BE UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.
9. SEE OLD CROW N SITE PLAN PREPARED BY KELLEY SURVEYING, FOR COMPLETE CONSTRUCTION & EROSION AND SEDIMENT CONTROL DETAILS.



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www.slsurveys.com

| | | | |
|---------------------|----------|-------------------------|-------|
| TOPO SECTION: | | OPERATOR: | |
| POWHATAN POINT 7.5' | | PREPARED FOR: | |
| COUNTY | DISTRICT | TUG HILL OPERATING, LLC | |
| MARSHALL | FRANKLIN | 380 SOUTHPOINTE BLVD | |
| | | SUITE 200 | |
| | | CANONSBURG, PA 15317 | |
| DRAWN BY | JOB NO. | DATE | SCALE |
| K.G.M. | 8769 | 05/29/19 | NONE |

WV Department of Environmental Protection

TUG HILL OPERATING

47 05 102239



Well Site Safety Plan

Tug Hill Operating, LLC

ju
6/5/19

Well Name: Old Crow N-7HM

Pad Location: Old Crow Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

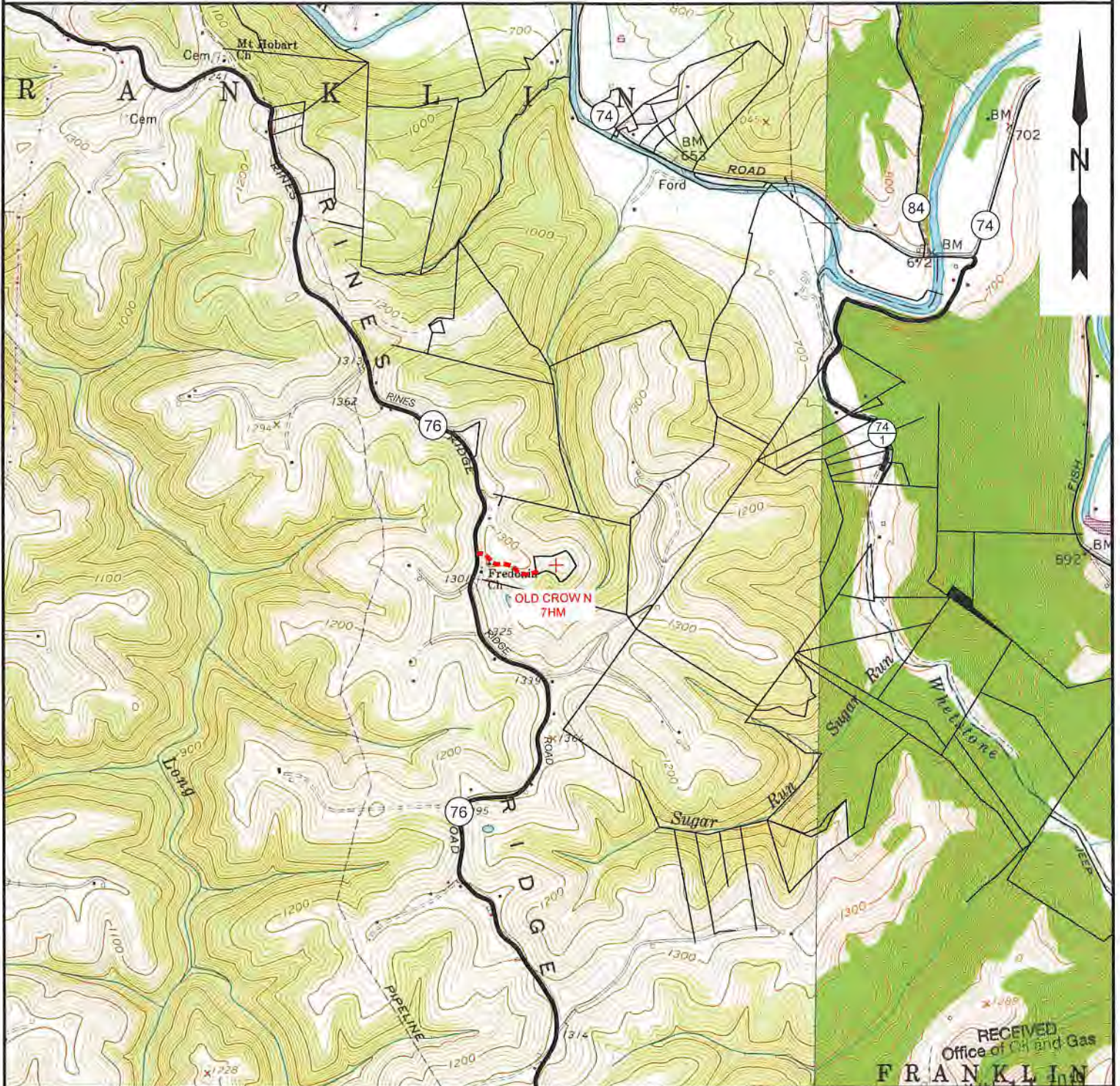
Northing: 4,403,199.66

Easting: 520,291.14

June 2019

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PROPOSED OLD CROWN - 7HM



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Office of Oil and Gas
FRANKLIN
JUN 11 2019

NOTE: CLOSEST WATER PURVEYOR
GRANDVIEW - DOOLIN PUBLIC SERVICE DISTRICT
PROCTOR, WV

LAT: 39.7137712
LON: -80.8258327
LOCATED: S 37°39'00" W AT 29,404.13' FROM OLD CROWN PAD LOCATION

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| | | | |
|-----------------------------------|----------|-------------------------|------------|
| TOPO SECTION: | | OPERATOR: | |
| GLEN EASTON & POWHATAN POINT 7.5' | | PREPARED FOR: | |
| COUNTY | DISTRICT | TUG HILL OPERATING, LLC | |
| MARSHALL | FRANKLIN | 380 SOUTHPOINTE BLVD | |
| | | SUITE 200 | |
| | | CANONSBURG, PA 15317 | |
| DRAWN BY | JOB NO. | DATE | SCALE |
| K.G.M. | 8796 | 05/29/19 | 1" = 2000' |



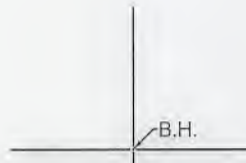
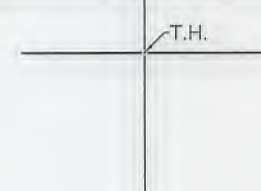
TUG HILL
OPERATING

**OLD CROW N LEASE
WELL 7HM
TUG HILL OPERATING**

T.H. LATITUDE 39°47'30"
B.H. LATITUDE 39°50'00"

| (S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH) | | |
|--|-------------------|--------------------|
| NAD'83 S.P.C.(FT) | N. 468,162.89 | E. 1,613,530.67 |
| NAD'83 GEO. | LAT-(N) 39.778495 | LONG-(W) 80.763051 |
| NAD'83 UTM (M) | N. 4,403,199.66 | E. 520,291.14 |
| LANDING POINT | | |
| NAD'83 S.P.C.(FT) | N. 471,122.6 | E. 1,616,961.1 |
| NAD'83 GEO. | LAT-(N) 39.786752 | LONG-(W) 80.750993 |
| NAD'83 UTM (M) | N. 4,404,118.8 | E. 521,321.2 |
| BOTTOM HOLE | | |
| NAD'83 S.P.C.(FT) | N. 479,299.9 | E. 1,612,970.6 |
| NAD'83 GEO. | LAT-(N) 39.809022 | LONG-(W) 80.767737 |
| NAD'83 UTM (M) | N. 4,406,586.7 | E. 519,881.0 |

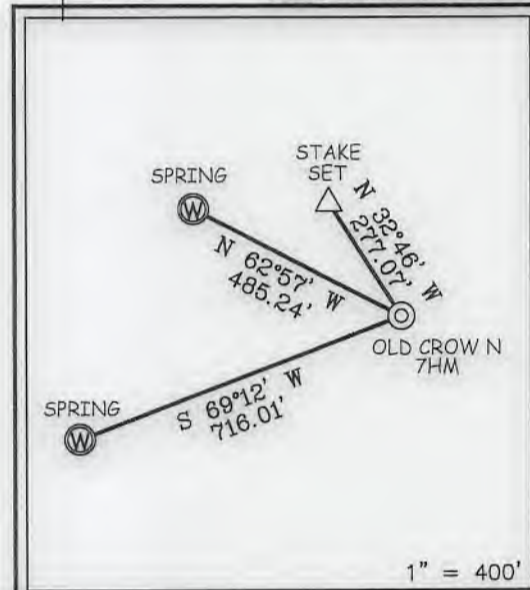
T.H. LONGITUDE 80°45'00"
B.H. LONGITUDE 80°45'00"
4,798' T.H.
8,856' B.H.



NOTES ON SURVEY

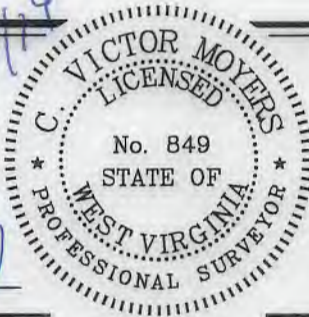
- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE ARE 1"=2000'
- THE ASSESSMENT OF THE 1/10 ACRE LOT, OWNED BY JASON J. STEED AND DESCRIBED AS THE SECOND PARCEL IN DEED BOOK 843 PAGE 319 AND CORRECTIVE DEED 843 PAGE 300, IS NOT CURRENTLY ACCOUNTED FOR WITHIN THE 135.61 ACRE ASSESSMENT OF SURFACE TAX MAP 5-9-13.2
- TAX MAPS AND TAX ASSESSMENTS FOR PARCELS 5-9-4, 5-9-35 AND 5-9-41 DO NOT APPEAR TO CORRECTLY DEPICT PARCEL BOUNDARIES AND/OR ACREAGES AS DESCRIBED IN THEIR RESPECTIVE DEEDS.

REFERENCES



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 REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

6/15/19



P.S. *C. Victor Moyers*
849

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE MAY 28, 20 19
REVISED _____, 20 ____
OPERATORS WELL NO. OLD CROW N-7HM
API WELL NO. 47 - 51 - 02239
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8796P7HM.dwg
OLD CROW NORTH 7HM REV1
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS



WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ IF "GAS" PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X

LOCATION: GROUND = 1,287.60' ELEVATION PROPOSED = 1,264.99' WATERSHED TRIBUTARY OF FISH CREEK (HUC-10)

DISTRICT FRANKLIN COUNTY MARSHALL QUADRANGLE POWHATAN POINT 7.5'

SURFACE OWNER DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO ACREAGE 71.205±

ROYALTY OWNER DONNA VIVIAN YOHO, ET AL ACREAGE 71.205±

PROPOSED WORK: LEASE NO. SEE WW-6A1

DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ PLUG AND ABANDON ___ CLEAN OUT AND REPLUG ___ OTHER ___

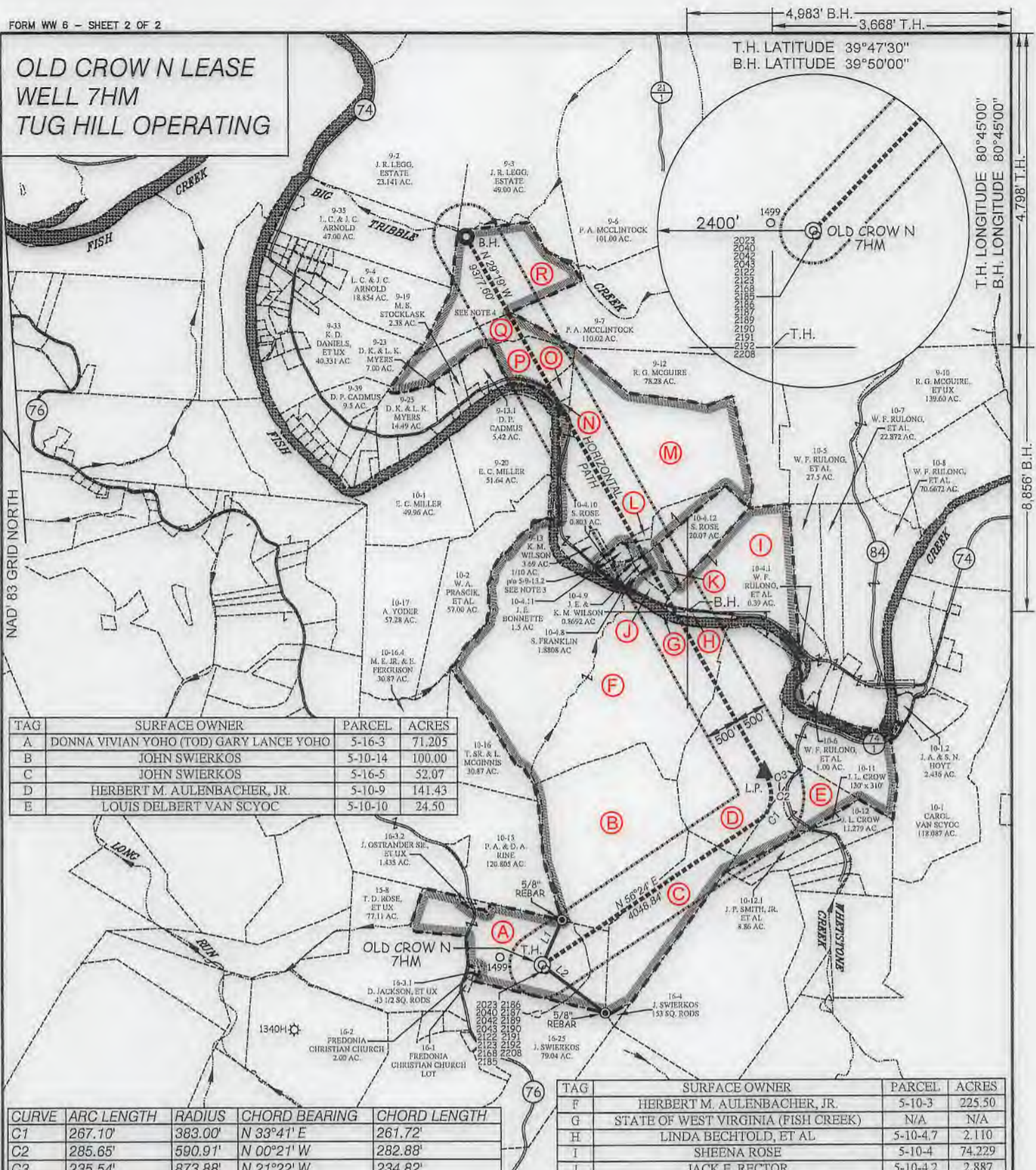
PHYSICAL CHANGE IN WELL (SPECIFY) _____ TARGET FORMATION MARCELLUS

ESTIMATED DEPTH TVD: 6,727' / TMD: 18,041'

COUNTY NAME
PERMIT

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD
FORT WORTH, TX 76107 CHARLESTON, WV 25313

**OLD CROW N LEASE
WELL 7HM
TUG HILL OPERATING**



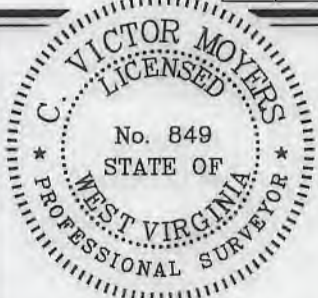
| TAG | SURFACE OWNER | PARCEL | ACRES |
|-----|---|---------|--------|
| A | DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO | 5-16-3 | 71.205 |
| B | JOHN SWIERKOS | 5-10-14 | 100.00 |
| C | JOHN SWIERKOS | 5-16-5 | 52.07 |
| D | HERBERT M. AULENBACHER, JR. | 5-10-9 | 141.43 |
| E | LOUIS DELBERT VAN SCYOC | 5-10-10 | 24.50 |

| TAG | SURFACE OWNER | PARCEL | ACRES |
|-----|-------------------------------------|----------|-------------|
| F | HERBERT M. AULENBACHER, JR. | 5-10-3 | 225.50 |
| G | STATE OF WEST VIRGINIA (FISH CREEK) | N/A | N/A |
| H | LINDA BECHTOLD, ET AL | 5-10-4.7 | 2,110 |
| I | SHEENA ROSE | 5-10-4 | 74.229 |
| J | JACK E. RECTOR | 5-10-4.2 | 2,887 |
| K | ANTHONY A. & KAREN L. ANKROM | 5-10-4.3 | 5,697 |
| L | SHEENA ROSE | 5-9-16 | 1.65 |
| M | JASON J. STEED | 5-9-13.2 | 135.61 |
| N | DENNIS P. CADMUS | 5-9-14 | 136 POLES |
| O | DENNIS P. CADMUS | 5-9-15 | 3.85 |
| P | DENNIS P. CADMUS | 5-9-17 | 28,063 |
| Q | DENNIS P. CADMUS | 5-9-24 | 21 AC 49 P. |
| R | LLOYD C. & JUDITH C. ARNOLD | 5-9-41 | 93.00 |

| CURVE | ARC LENGTH | RADIUS | CHORD BEARING | CHORD LENGTH |
|-------|------------|---------|---------------|--------------|
| C1 | 267.10' | 383.00' | N 33°41' E | 261.72' |
| C2 | 285.65' | 590.91' | N 00°21' W | 282.88' |
| C3 | 235.54' | 873.88' | N 21°22' W | 234.82' |

| LINE | BEARING | DISTANCE |
|------|------------|----------|
| L1 | N 23°38' E | 757.90' |
| L2 | S 52°51' E | 1216.06' |

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vancott Drive • Glenville, WV 26351 • (304) 462-5634
www.slsww.com



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

P.S. 849 *C. Victor Moyers*

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- TAX MAP-PARCEL
- SURFACE OWNER (SEE TABLE)
- LEASE # (SEE WW-6A1)

SCALE 1" = 2000' FILE NO. 8796P7HM.dwg
 DATE MAY 28, 2019
 OPERATORS WELL NO. OLD CROW N-7HM
 API WELL NO. 47
 NO. STATE COUNTY PERMIT

STATE OF WEST VIRGINIA
 DIVISION OF
 ENVIRONMENTAL PROTECTION
 OFFICE OF OIL AND GAS

WELL OPERATOR TUG HILL OPERATING, LLC ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107
 DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME
 PERMIT

**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 |
|-------------------------|-----------------------|-----------------------|---------|-----------|
|-------------------------|-----------------------|-----------------------|---------|-----------|

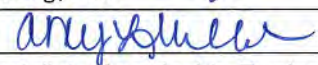
*See attached pages

**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 
 Its: Permitting Specialist - Appalachia Region

| Lease ID | Parcel | Tag | Grantor, Lessor, Etc. | Grantee, Lessee, Etc. | Royalty | Deed Book/Page | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|------------|--------|-----|---|-----------------------|---------|----------------|------------|------------|------------|---|---|---|--|
| 10*21475 | 5-9-15 | O | WOODROW N WARD AND HILDA A WARD | TH EXPLORATION LLC | 1/8+ | 957 124 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21478 | 5-9-15 | O | CHILDRENS HOME SOCIETY OF WEST VIRGINIA | TH EXPLORATION LLC | 1/8+ | 960 173 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21547 | 5-9-15 | O | GARY A MILLER AND MARCELLE T MILLER | TH EXPLORATION LLC | 1/8+ | 952 370 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21548 | 5-9-15 | O | JEANNE M MILLER | TH EXPLORATION LLC | 1/8+ | 952 386 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21608 | 5-9-15 | O | BONNIE LOU POSTLEWAIT | TH EXPLORATION LLC | 1/8+ | 959 313 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21719 | 5-9-15 | O | ROBERT A MILLER | TH EXPLORATION LLC | 1/8+ | 952 389 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21835 | 5-9-15 | O | KENNETH ALLEN AND CARLA JO ALLEN | TH EXPLORATION LLC | 1/8+ | 962 572 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21937 | 5-9-15 | O | WHEELING SOCIETY FOR CRIPPLED CHILDREN JAY E PRAGER PRESIDENT | TH EXPLORATION LLC | 1/8+ | 960 33 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22044 | 5-9-15 | O | MICHAEL A BISHOP | TH EXPLORATION LLC | 1/8+ | 960 421 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22045 | 5-9-15 | O | DOUGLAS R BISHOP | TH EXPLORATION LLC | 1/8+ | 961 417 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22296 | 5-9-15 | O | NOAH BAKER AND ALISA BAKER | TH EXPLORATION LLC | 1/8+ | 962 200 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22326 | 5-9-15 | O | RACHEL SONDA AND SCOTT SONDA | TH EXPLORATION LLC | 1/8+ | 962 532 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22407 | 5-9-15 | O | BRADLEY MURPHY | TH EXPLORATION LLC | 1/8+ | 962 575 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22430 | 5-9-15 | O | DEBORAH VANVRANKEN | TH EXPLORATION LLC | 1/8+ | 964 510 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22451 | 5-9-15 | O | GERALD L BISHOP III | TH EXPLORATION LLC | 1/8+ | 964 31 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22492 | 5-9-15 | O | FAITH MARIE FREESTONE AND ERIC FREESTONE | TH EXPLORATION LLC | 1/8+ | 972 50 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22547 | 5-9-15 | O | LAWRENCE EDWARD MURPHY AND JOAN MARIE MURPHY | TH EXPLORATION LLC | 1/8+ | 966 628 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22566 | 5-9-15 | O | KENNETH A MILLER | TH EXPLORATION LLC | 1/8+ | 964 233 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22606 | 5-9-15 | O | ROBERT B MURPHY AND LINDA MURPHY | TH EXPLORATION LLC | 1/8+ | 966 469 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*22636 | 5-9-15 | O | CHANDA WILSON AND DANIEL WILSON | TH EXPLORATION LLC | 1/8+ | 968 226 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*23035 | 5-9-15 | O | DEAN S CARR | TH EXPLORATION LLC | 1/8+ | 977 364 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*23508 | 5-9-15 | O | MICHAEL A MURPHY | TH EXPLORATION LLC | 1/8+ | 1009 98 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*24888 | 5-9-15 | O | ARTHUR LEE MILLER ET AL | TH EXPLORATION LLC | 1/8+ | 1027 187 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*24985 | 5-9-15 | O | JONATHAN BAKER | TH EXPLORATION LLC | 1/8+ | 1027 558 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*25642 | 5-9-15 | O | SANDRA AKA KATHERINE S PARDINI | TH EXPLORATION LLC | 1/8+ | 1031 540 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Q090332001 | 5-9-15 | O | WILLIAM E MILLER ET UX | NOBLE ENERGY INC | 1/8+ | 858 256 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/1 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| Q090332002 | 5-9-15 | O | LORETTA JEAN RIGGLE ET VIR | NOBLE ENERGY INC | 1/8+ | 860 538 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/172 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| Q090332003 | 5-9-15 | O | PATTY BERISFORD ET VIR | NOBLE ENERGY INC | 1/8+ | 860 555 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/313 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| Q090332007 | 5-9-15 | O | ROBERT RANDOLPH WOODBURN ET UX | NOBLE ENERGY INC | 1/8+ | 860 568 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/313 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| 10*18796 | 5-9-17 | P | DWG OIL & GAS ACQUISITIONS LLC | TH EXPLORATION LLC | 1/8+ | 938 476 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21414 | 5-9-17 | P | CHARLES R STOCKTON AND BETTY M HUDSON | TH EXPLORATION LLC | 1/8+ | 959 310 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21473 | 5-9-17 | P | MARY E BISHOP | TH EXPLORATION LLC | 1/8+ | 957 232 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21475 | 5-9-17 | P | WOODROW N WARD AND HILDA A WARD | TH EXPLORATION LLC | 1/8+ | 957 124 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21478 | 5-9-17 | P | CHILDRENS HOME SOCIETY OF WEST VIRGINIA | TH EXPLORATION LLC | 1/8+ | 960 173 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21547 | 5-9-17 | P | GARY A MILLER AND MARCELLE T MILLER | TH EXPLORATION LLC | 1/8+ | 952 370 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21548 | 5-9-17 | P | JEANNE M MILLER | TH EXPLORATION LLC | 1/8+ | 952 386 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21608 | 5-9-17 | P | BONNIE LOU POSTLEWAIT | TH EXPLORATION LLC | 1/8+ | 959 313 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21719 | 5-9-17 | P | ROBERT A MILLER | TH EXPLORATION LLC | 1/8+ | 952 389 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*21835 | 5-9-17 | P | KENNETH ALLEN AND CARLA JO ALLEN | TH EXPLORATION LLC | 1/8+ | 962 572 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

| Lease ID | Parcel | Tag | Grantor, Lessor, Etc. | Grantee, Lessee, Etc. | Royalty | Deed Book/Page | | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment | |
|------------|--------|-----|---|-----------------------|---------|----------------|-----|--|--|--|---|---|--|--|
| 10*21937 | 5-9-17 | P | WHEELING SOCIETY FOR CRIPPLED CHILDREN JAY E PRAGER PRESIDENT | TH EXPLORATION LLC | 1/8+ | 960 | 33 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22044 | 5-9-17 | P | MICHAEL A BISHOP | TH EXPLORATION LLC | 1/8+ | 960 | 421 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22045 | 5-9-17 | P | DOUGLAS R BISHOP | TH EXPLORATION LLC | 1/8+ | 961 | 417 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22296 | 5-9-17 | P | NOAH BAKER AND ALISA BAKER | TH EXPLORATION LLC | 1/8+ | 962 | 200 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22326 | 5-9-17 | P | RACHEL SONDA AND SCOTT SONDA | TH EXPLORATION LLC | 1/8+ | 962 | 532 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22407 | 5-9-17 | P | BRADLEY MURPHY | TH EXPLORATION LLC | 1/8+ | 962 | 575 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22430 | 5-9-17 | P | DEBORAH VANVRANKEN | TH EXPLORATION LLC | 1/8+ | 964 | 510 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22451 | 5-9-17 | P | GERALD L BISHOP III | TH EXPLORATION LLC | 1/8+ | 964 | 31 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22492 | 5-9-17 | P | FAITH MARIE FREESTONE AND ERIC FREESTONE | TH EXPLORATION LLC | 1/8+ | 972 | 50 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22547 | 5-9-17 | P | LAWRENCE EDWARD MURPHY AND JOAN MARIE MURPHY | TH EXPLORATION LLC | 1/8+ | 966 | 628 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22566 | 5-9-17 | P | KENNETH A MILLER | TH EXPLORATION LLC | 1/8+ | 964 | 233 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22606 | 5-9-17 | P | ROBERT B MURPHY AND LINDA MURPHY | TH EXPLORATION LLC | 1/8+ | 966 | 469 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*22636 | 5-9-17 | P | CHANDA WILSON AND DANIEL WILSON | TH EXPLORATION LLC | 1/8+ | 968 | 226 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*23035 | 5-9-17 | P | DEAN S CARR | TH EXPLORATION LLC | 1/8+ | 977 | 364 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*23508 | 5-9-17 | P | MICHAEL A MURPHY | TH EXPLORATION LLC | 1/8+ | 1009 | 98 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*24888 | 5-9-17 | P | ARTHUR LEE MILLER ET AL | TH EXPLORATION LLC | 1/8+ | 1027 | 187 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*24985 | 5-9-17 | P | JONATHAN BAKER | TH EXPLORATION LLC | 1/8+ | 1027 | 558 | N/A | N/A | N/A | N/A | N/A | N/A | |
| 10*25642 | 5-9-17 | P | SANDRA AKA KATHERINE S PARDINI | TH EXPLORATION LLC | 1/8+ | 1031 | 540 | N/A | N/A | N/A | N/A | N/A | N/A | |
| Q090332001 | 5-9-17 | P | WILLIAM E MILLER ET UX | NOBLE ENERGY INC | 1/8+ | 858 | 256 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/1 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| Q090332002 | 5-9-17 | P | LORETTA JEAN RIGGLE ET VIR | NOBLE ENERGY INC | 1/8+ | 860 | 538 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/172 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| Q090332003 | 5-9-17 | P | PATTY BERISFORD ET VIR | NOBLE ENERGY INC | 1/8+ | 860 | 555 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/313 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| Q090332007 | 5-9-17 | P | ROBERT RANDOLPH WOODBURN ET UX | NOBLE ENERGY INC | 1/8+ | 860 | 568 | N/A | N/A | N/A | Noble Energy Inc to CNX Gas Company LLC: 35/313 | CNX Gas Company LLC to Noble Energy Inc: 37/169 | Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX866958 | 5-9-24 | Q | ANITA L. SLOUGH ET AL | AB RESOURCES LLC | 1/8+ | 696 | 7 | AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484 | Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1 | Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105 | AB Resources LLC to NPAR LLC: 25/484 | NPAR LLC to Chevron USA: 756/332 | Chevron USA Inc to HG Energy II Appalachia LLC: 41/155 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX866959 | 5-9-24 | Q | PAUL SCHEIBELHOOD ET AL | AB RESOURCES LLC | 1/8+ | 695 | 629 | AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484 | Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1 | Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105 | AB Resources LLC to NPAR LLC: 25/484 | NPAR LLC to Chevron USA: 756/332 | Chevron USA Inc to HG Energy II Appalachia LLC: 41/155 | Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |

| Lease ID | Parcel | Tag | Grantor, Lessor, Etc. | Grantee, Lessee, Etc. | Royalty | Deed Book/Page | | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|-----------|--------|-----|-----------------------|-----------------------|---------|----------------|-----|------------|------------|------------|------------|------------|--|
| CVX935273 | 5-9-24 | Q | PAUL PARSONS ET UX | CHEVRON U.S.A., INC. | 1/8+ | 853 | 430 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX935276 | 5-9-24 | Q | SHARON LYN RUSSELL | CHEVRON U.S.A., INC. | 1/8+ | 853 | 422 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX935969 | 5-9-24 | Q | TIMOTHY HUFF ET UX | CHEVRON U.S.A., INC. | 1/8+ | 864 | 47 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX936053 | 5-9-24 | Q | LLOYD C. ARNOLD ET UX | CHEVRON U.S.A., INC. | 1/8+ | 864 | 39 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX936054 | 5-9-24 | Q | MARY JO CRONIN | CHEVRON U.S.A., INC. | 1/8+ | 864 | 43 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX936058 | 5-9-24 | Q | RICHARD KURPIL ET UX | CHEVRON U.S.A., INC. | 1/8+ | 863 | 594 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX936061 | 5-9-24 | Q | CLARA MAE CLIFTON | CHEVRON U.S.A., INC. | 1/8+ | 853 | 426 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX936062 | 5-9-24 | Q | GEORGE EDWARDS ET UX | CHEVRON U.S.A., INC. | 1/8+ | 853 | 418 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX936112 | 5-9-24 | Q | DONNA FAE KYLE | CHEVRON U.S.A., INC. | 1/8+ | 853 | 449 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |

| Lease ID | Parcel | Tag | Grantor, Lessor, Etc. | Grantee, Lessee, Etc. | Royalty | Deed Book/Page | | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|-----------|--------|-----|------------------------|-----------------------|---------|----------------|-----|------------|------------|------------|------------|------------|--|
| CVX935271 | 5-9-24 | Q | CHARLES W MILLER ET UX | CHEVRON U.S.A., INC. | 1/8+ | 853 | 59 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| CVX936113 | 5-9-24 | Q | JUDITH MAY CONNER | CHEVRON U.S.A., INC. | 1/8+ | 853 | 445 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to HG Energy II Appalachia LLC: 41/154 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 |
| 10*26046 | 5-9-41 | R | ARNOLD LLOYD C ET UX | CHEVRON USA INC | 1/8+ | 915 | 628 | N/A | N/A | N/A | N/A | N/A | Chevron USA Inc to TH Exploration LLC: 43/95 |

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.

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STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

ASSIGNMENT AND BILL OF SALE

This **ASSIGNMENT AND BILL OF SALE** (this "Assignment") dated as of August 1, 2017 (the "Signing Date"), but effective from and after 7:00 a.m., Eastern Standard Time on August 2, 2017 being the day immediately following the Signing Date (the "Effective Date"), is made by **Chevron U.S.A. Inc.**, a Pennsylvania corporation, with an address at 700 Cherrington Parkway, Coraopolis, PA 15108 ("Chevron" or "Assignor") to **TH Exploration II, LLC** and **TH Exploration, LLC**, Texas limited liability companies, with an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (collectively "Assignee") and is accepted by Assignee upon the following terms and conditions.

RECITALS

- A. Assignor desires to sell, convey, transfer, assign and deliver to Assignee Assignor's Bryan 1H well and certain related assets, including certain leasehold interests, located in Marshall County, West Virginia.
- B. Through an Acreage Trade Agreement to be executed contemporaneously with this Assignment, Assignor desires to transfer, convey and assign to Assignee certain of Assignor's oil and gas leasehold interests located in Marshall County, West Virginia in exchange for the transfer, conveyance and assignment to Assignor by Assignee certain of Assignee's oil and gas leasehold interests located in Marshall County, West Virginia and Greene County, West Virginia.
- C. In consideration of the mutual promises set out in this Assignment, including execution of the Acreage Trade Agreement, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to be bound by the terms of this Assignment.

1. DEFINITIONS

1.1 **Definitions.** As used in this Assignment, these words and expressions have the following meanings:

"Acreage Trade Agreement" means that certain Acreage Trade Agreement by and between Chevron U.S.A. Inc. and TH Exploration, LLC with an Effective Date of August 1, 2017 to be contemporaneously executed with this Assignment.

"Act" has the meaning given to such term in Section 9.1(C).

"Affiliate" means any legal entity which controls, is controlled by, or is under common control with, another legal entity. An entity is deemed to "control" another if it owns directly or indirectly at least fifty percent of either of the following: (A) the shares entitled to vote at a general election of directors of such other entity or (B) the voting interest in such other entity if such entity does not have either shares or directors.

"Applicable Law(s)" means all laws, principles of common law, regulations, statutes, codes, rules, orders, ordinances, permits, enforceable policies, licenses, certifications, decrees, constitutions, standards or other requirements with similar effect of any Government Entity and any binding interpretations of the foregoing.

"Assets" has the meaning given to such term in Section 2.1 of this Assignment.

"Assigned Hydrocarbons" means all Hydrocarbons produced and severed from, or allocable, after severance, to the Leases, Units, and Wells on and after the Effective Date.

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MICHAEL MORAN
BRIGHTON RESOURCES
5851 ELLSWORTH AVENUE, #1
PITTSBURGH PA 15232-1707

BOOK 0:040 PAGE 0127

STATE OF WEST VIRGINIA §
§
COUNTY OF MARSHALL §

Marshall County
Jan Pest, Clerk
Instrument 1428356
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 1 day of AUGUST, 2017 (the "Effective Date"), by and between CHEVRON U.S.A. INC. (hereinafter "Assignor") and TH 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

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STATE OF WEST VIRGINIA §
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COUNTY OF MARSHALL §

ASSIGNMENT AND BILL OF SALE

This **ASSIGNMENT AND BILL OF SALE** (this "Assignment") dated as of February 7, 2019 (the "Signing Date"), but effective from and after 7:00 a.m., Eastern Standard Time on February 1, 2019 (the "Effective Date"), is made by **Chevron U.S.A. Inc.**, a Pennsylvania corporation, with an address at 700 Cherrington Parkway, Coraopolis, PA 15108 ("Chevron" or "Assignor") to **TH Exploration II, LLC** and **TH Exploration, LLC**, Texas limited liability companies, with an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (collectively "Assignee") and is accepted by Assignee upon the following terms and conditions.

RECITALS

- A. Assignor desires to sell, convey, transfer, assign and deliver to Assignee Assignor's Crawford 1 well and certain related assets, including certain leasehold interests, located in Marshall County, West Virginia.
- B. Through an Acreage Trade Agreement to be executed contemporaneously with this Assignment, Assignor desires to transfer, convey and assign to Assignee certain of Assignor's oil and gas leasehold interests located in Marshall County, West Virginia in exchange for the transfer, conveyance and assignment to Assignor by Assignee certain of Assignee's oil and gas leasehold interests located in Marshall County, West Virginia.
- C. In consideration of the mutual promises set out in this Assignment, including execution of the Acreage Trade Agreement, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to be bound by the terms of this Assignment.

1. DEFINITIONS

1.1 **Definitions.** As used in this Assignment, these words and expressions have the following meanings:

"Acreage Trade Agreement" means that certain Acreage Trade Agreement by and between Chevron U.S.A. Inc. and TH Exploration, LLC with an Effective Date of February 1, 2019 to be contemporaneously executed with this Assignment.

"Act" has the meaning given to such term in Section 9.1(C).

"Affiliate" means any legal entity which controls, is controlled by, or is under common control with, another legal entity. An entity is deemed to "control" another if it owns directly or indirectly at least fifty percent of either of the following: (A) the shares entitled to vote at a general election of directors of such

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June 7, 2019

WV Department of Environmental Protection
Office of Oil & Gas
601 57th Street, SE
Charleston, WV 25304
Attention: Laura Adkins

RE: Old Crow N-7HM

Subject: Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Old Crow N-7HM. well plat.

If your office has any questions or concerns regarding the contents of this letter, please do not hesitate to contact me directly at 304-376-0111, or by email at amiller@tug-hill.com.

Sincerely,

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

Amy L. Miller
Permitting Specialist – Appalachia Region

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WW-6AC
(1/12)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE CERTIFICATION

Date of Notice Certification: 06/07/2019

API No. 47- 051 -
Operator's Well No. Old Crow N-7HM
Well Pad Name: Old Crow

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

| | | | | |
|-------------|---------------------|---------------------------|-----------|--------------------------|
| State: | West Virginia | UTM NAD 83 | Easting: | 520,291.14 |
| County: | Marshall | | Northing: | 4,403,199.66 |
| District: | Franklin | Public Road Access: | | Rines Ridge Road (CR 76) |
| Quadrangle: | Powhatan Point 7.5' | Generally used farm name: | | Donna Yoho |
| Watershed: | Fish Creek (HUC 10) | | | |

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

| | |
|--|--|
| <p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p> | <p align="center">OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> |
|--|--|

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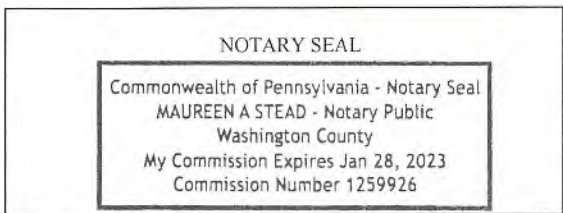
Required Attachments:

The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

Certification of Notice is hereby given:

THEREFORE, I Amy L. Miller, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

| | | | |
|----------------|--|------------|---|
| Well Operator: | <u>Tug Hill Operating, LLC</u> | Address: | <u>380 Southpointe Boulevard, Plaza II, Suite 200</u> |
| By: | <u>Amy L. Miller <i>Amy Miller</i></u> | | <u>Canonsburg, PA 15317</u> |
| Its: | <u>Permitting Specialist - Appalachia Region</u> | Facsimile: | <u>724-338-2030</u> |
| Telephone: | <u>724-749-8388</u> | Email: | <u>amiller@tug-hillop.com</u> |



Subscribed and sworn before me this 7 day of JUNE, 2019.
Maureen A Stead Notary Public
My Commission Expires 1/28/23

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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WW-6A
(9-13)

API NO. 47- 051 -
OPERATOR WELL NO. Old Crow N-7HM
Well Pad Name: Old Crow

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 6/6/2019 **Date Permit Application Filed:** 6/7/2019

Notice of:

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s)

Name: Donna Yoho
 Address: 3682 Rines Ridge Road
Proctor, WV 26055
 Name: _____
 Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)

Name: _____
 Address: _____
 Name: _____
 Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
 Address: _____

COAL OWNER OR LESSEE

Name: Consol Energy, Inc. Leatherwood, Inc. Attn: Casey Saunders
 Address: 1000 CONSOL Energy DRive
Canonsburg, PA 15317

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COAL OPERATOR

Name: _____
 Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)

Name: *See attached list
 Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: _____
 Address: _____

*Please attach additional forms if necessary

WW-6A
(8-13)

API NO. 47- 051 -
OPERATOR WELL NO. Old Crow N-7HM
Well Pad Name: Old Crow

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

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examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

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Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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WW-6A
(8-13)

API NO. 47- 051 -
OPERATOR WELL NO. Old Crow N-7HM
Well Pad Name: Old Crow

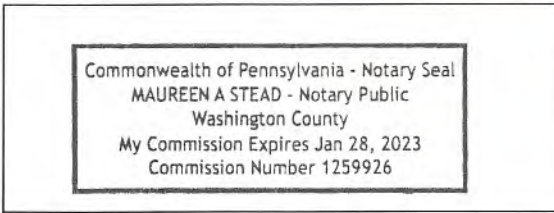
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.com *amy miller*

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



Subscribed and sworn before me this 6 day of JUNE, 2019.
Maureen A Stead Notary Public
My Commission Expires 1/28/23

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Exhibit WW-6A

Tug Hill Operating, LLC
 380 Southpointe Blvd, Suite 200
 Cannonsburg, PA 15137

Residences within Two-Thousand Feet (2,000')

Well: Old Crow N – 7HM
 District: Franklin (Residence #'s 1-7)
 State: WV

There are seven (7) residences, no businesses, no churches, no schools or no emergency facilities within two-thousand feet (2,000') of the above referenced well location.

| | | |
|---|--|---|
| <p>Residence 1 TM 16 Pcl. 3.1 Dennis Jackson, Et Ux Phone: 304-843-1762 Physical Address: 4004 Rines Ridge Rd. Proctor, WV 26055 Tax Address: P.O. Box 109 Woodsfield, OH 43793</p> | <p>Residence 2 TM 16 Pcl. 3 Donna Vivian Yoho - TOD Phone: 304-845-5590 (Rev. Address) Physical Address: 3862 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p> | <p>Residence 3 TM 16 Pcl. 3.2 Jimmy Ostrander, Sr., Et Ux Phone: 304-845-5599, 304-845-5590 Physical Address: 3810 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p> |
| <p>Residence 4 TM 16 Pcl. 6 John Swierkos Phone: 304-810-4092 Physical Address: 110 Rahm Dr. Proctor, WV 26055 Tax Address: Same</p> | <p>Residence 5 TM 16 Pcl. 23.3 Greg & Christina Riddle Phone: 304-843-0173 Physical Address: 4205 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p> | <p>Residence 6 TM 16 Pcl. 23.1 Ray E. Minor, Et Ux Phone: 304-843-1713 Physical Address: 4193 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p> |
| <p>Residence 7 TM 16 Pcl. 24 Alan M. Beyser, Et Ux Phone: 304-810-0617 Physical Address: 4271 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p> | | <p style="text-align: center;"> RECEIVED Office of Oil and Gas JUN 11 2019 WV Department of Environmental Protection </p> |

PROPOSED OLD CROW N - 7HM



NOTE: THERE APPEARS TO BE SEVEN (7) POSSIBLE WATER SOURCES WITHIN 2,000'.

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www.slsurveys.com

| | | | |
|-----------------------------------|----------|-------------------------|------------|
| TOPO SECTION: | | OPERATOR: | |
| GLEN EASTON & POWHATAN POINT 7.5' | | PREPARED FOR: | |
| COUNTY | DISTRICT | TUG HILL OPERATING, LLC | |
| MARSHALL | FRANKLIN | 380 SOUTHPOINTE BLVD | |
| DRAWN BY | | DATE | SCALE |
| K.G.M. | | 05/29/19 | 1" = 1000' |

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Environmental Protection

TUG HILL
OPERATING

WW-6A3
(1/12)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF ENTRY FOR PLAT SURVEY

Notice Time Requirement: Notice shall be provided at least **SEVEN (7)** days but no more than **FORTY-FIVE (45)** days prior to entry

Date of Notice: 11/16/2017 **Date of Planned Entry:** 11/24/2017

Delivery method pursuant to West Virginia Code § 22-6A-10a

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

Notice is hereby provided to:

SURFACE OWNER(S)
 Name: Donna Vivian Yoho (Well Pad and Access Road)
 Address: 3862 Rines Ridge Road
Proctor, WV 26055

Name: _____
 Address: _____

Name: _____
 Address: _____

COAL OWNER OR LESSEE
 Name: CONSOL Energy, Inc. Leatherwood, Inc. Attn: Casey Saunders
 Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

MINERAL OWNER(S)
 Name: Donna Vivian Yoho
 Address: 3862 Rines Ridge Road
Proctor, WV 26055

*please attach additional forms if necessary

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

| | |
|--|---|
| State: <u>West Virginia</u> | Approx. Latitude & Longitude: <u>39.7784004; -80.7631353</u> |
| County: <u>Marshall</u> | Public Road Access: <u>Rines Ridge Road (County Route 76)</u> |
| District: <u>Franklin</u> | Watershed: <u>Fish Creek (HUC-10)</u> |
| Quadrangle: <u>Powhatan Point 7.5'</u> | Generally used farm name: <u>Donna Vivian Yoho</u> |

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
 Telephone: 724-749-8388
 Email: amiller@tug-hillop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
 Facsimile: 724-338-2030

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Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

WW-6A5
(1/12)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 06/06/2019 **Date Permit Application Filed:** 06/07/2019

Delivery method pursuant to West Virginia Code § 22-6A-16(c)

CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)

(at the address listed in the records of the sheriff at the time of notice):

Name: Donna Yoho
Address: 3862 Rines Ridge Road
Proctor, WV 26055

Name: _____
Address: _____

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

| | | | | |
|-------------|---|---------------------------|---|---------------------|
| State: | <u>West Virginia</u> | UTM NAD 83 | Easting: | <u>520,291.14</u> |
| County: | <u>Marshall</u> | | Northing: | <u>4,403,199.66</u> |
| District: | <u>Franklin</u> | Public Road Access: | <u>Rines Ridge Road (County Route 76)</u> | |
| Quadrangle: | <u>Powhatan Point 7.5'</u> | Generally used farm name: | <u>Donna Yoho</u> | |
| Watershed: | <u>Tributary of Fish Creek (HUC 10)</u> | | | |

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by **W. Va. Code § 22-6A-10(b)** to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Byrd E. White, III
Secretary of Transportation

May 6, 2019

Jimmy Wriston, P. E.
Deputy Secretary/
Acting Commissioner

James A. Martin, Chief
Office of Oil and Gas
Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Subject: DOH Permit for the Old Crow Pad, Marshall County
Old Crow N-7HM Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2018-0130 which has been issued to Tug Hill Operating, LLC for access to the State Road for a well site located off of Marshall County Route 76 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

Gary K. Clayton, P.E.
Regional Maintenance Engineer
Central Office O&G Coordinator

Cc: Amy Miller
Tug Hill Operating, LLC
CH, OM, D-6
File

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PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Old Crow N-7HM

| PRODUCT NAME: | CHEMICAL DESCRIPTION: | PRODUCT USE: | HAZARDOUS COMPONENT: |
|---------------|----------------------------------|------------------|--|
| GBW-20C | Hemicellulase Breaker | Breaker - Water | None |
| ALPHA 1427 | | Biocide | Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 000064-17-5 Water – CAS# 007732-18-5 |
| FRAC SAND | Silica Sand (various Mesh sizes) | Proppant | Crystalline silica (quartz) CAS# 14808-60-7 |
| S-8C, Sand | Silica Sand (100 mesh) | Sand | Silica – CAS# 14808-60-7 |
| GW-3LDF | | Gellant - Water | Petroleum Distillate Blend – Proprietary, (Not Associated with Diesel Fuel) Guar gum – CAS# 009000-30-0 |
| FRW-18 | | Friction Reducer | Hydrotreated light distillate CAS# 064742-47-8 |
| Scaletrol | | Scale Inhibitor | Ethylene glycol – CAS# 000107-21-1 Diethylene glycol – CAS# 000111-46-6 |

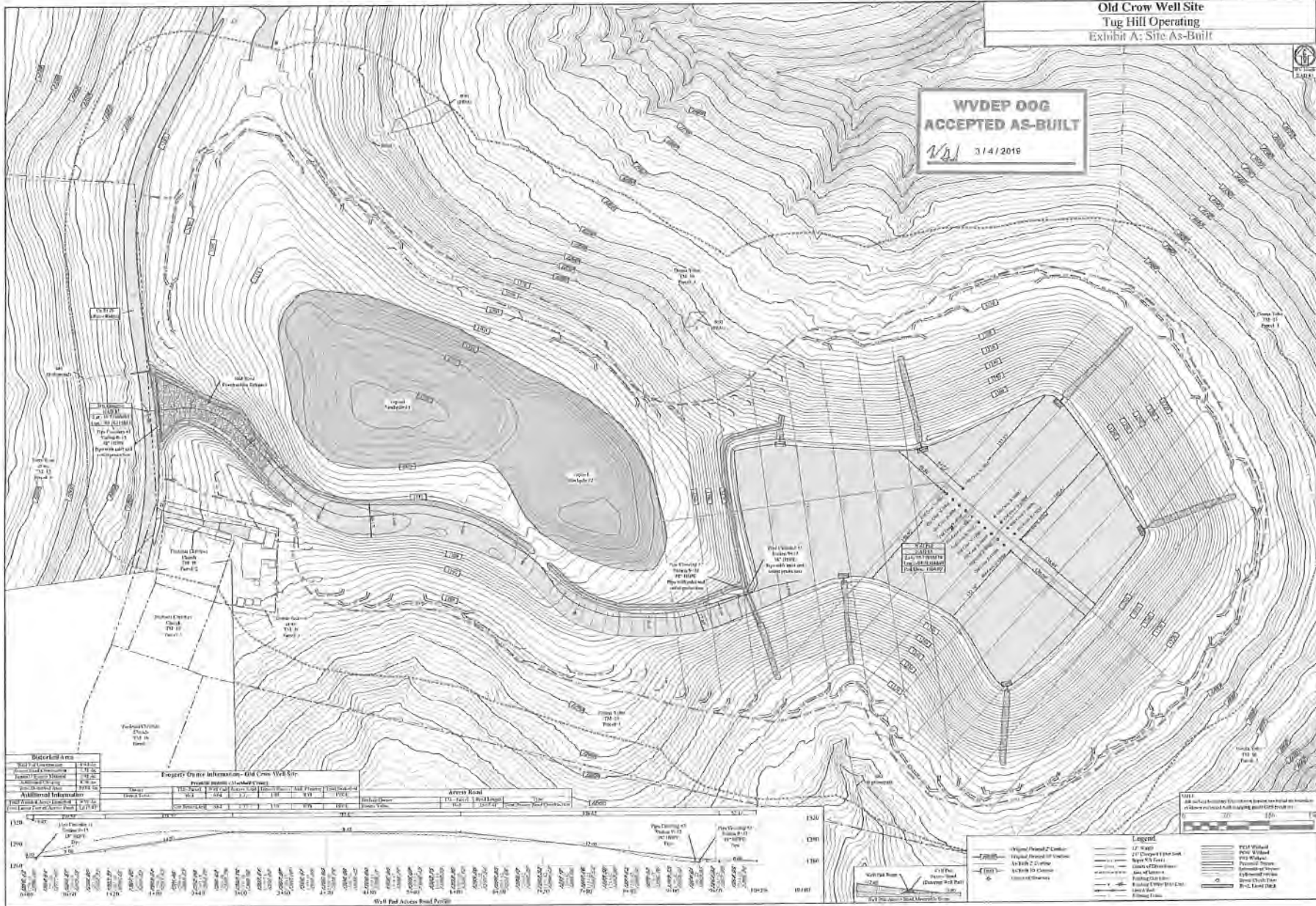
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Old Crow Well Site
Tug Hill Operating
Exhibit A: Site As-Built

WVDEP 006
ACCEPTED AS-BUILT
3/4/2016



Water Well Data

| Well ID | Depth (ft) | Production Capacity (gpm) | Flow Rate (gpm) | Water Level (ft) | Static Water Level (ft) | Flow Rate (gpm) | Water Level (ft) | Static Water Level (ft) |
|---------|------------|---------------------------|-----------------|------------------|-------------------------|-----------------|------------------|-------------------------|
| Well 1 | 120 | 100 | 100 | 120 | 120 | 100 | 120 | 120 |
| Well 2 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |

Property Owner Information - Old Crow Well Site

| Property ID | Owner Name | Address | City | State | Zip |
|-------------|------------|-------------|-------------|-------|-------|
| 1 | John Doe | 123 Main St | Springfield | VA | 22154 |
| 2 | Jane Smith | 456 Oak St | Springfield | VA | 22154 |

APPROX ROAD

| Station | Offset | Width | Material |
|---------|--------|-------|----------|
| 0+00 | 5.0 | 10.0 | Gravel |
| 0+50 | 5.0 | 10.0 | Gravel |
| 1+00 | 5.0 | 10.0 | Gravel |

Legend

- Original Parcel 2 Contour
- Original Parcel 1 Contour
- APPROX ROAD
- Utility Lines
- Well Pad Access Road (P001)
- Well Pad Access Road (P002)
- Well 1
- Well 2
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- Well 49
- Well 50

Scale: 1" = 100'

TUG HILL OPERATING

THIS FACILITY IS PREPARED FOR TUG HILL OPERATING

K+S

Overall Plan View
Old Crow Well Site
Franklin County, WV

Scale: 1" = 100'

Sheet 3 of 3