



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

Wednesday, May 09, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BOULEVARD, PLAZA II
SUITE 200
CANNONSBURG, PA 15317

Re: Permit Modification Approval for HEAVEN HILL 3-2HM
47-051-01962-00-00

Modified to Extend Lateral

TUG HILL OPERATING, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

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

James A. Martin
Chief

Operator's Well Number: HEAVEN HILL 3-2HM
Farm Name: RICKY L. WHITLATCH
U.S. WELL NUMBER: 47-051-01962-00-00
Horizontal 6A New Drill
Date Modification Issued: May 9, 2018

Promoting a healthy environment.

05/11/2018

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 Meade Glen Easton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Heaven Hill 3-2HM Well Pad Name: Heaven Hill 3

3) Farm Name/Surface Owner: Ricky L. Whitlatch Public Road Access: Yeater Lane CR 21/11

4) Elevation, current ground: 1326' Elevation, proposed post-construction: 1326'

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

(b) If Gas Shallow Deep
Horizontal

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3/28/18

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 6724 - 6776' thickness of 52' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,876'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 19,081'

11) Proposed Horizontal Leg Length: 11,331'

12) Approximate Fresh Water Strata Depths: 70', 1038'

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

14) Approximate Saltwater Depths: 2,167'

15) Approximate Coal Seam Depths: Sewickly Coal - 946' and Pittsburgh Coal - 1031'

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

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

(a) If Yes, provide Mine Info: Name: Marshall County Coal Co. / Marshall County Mine
Depth: 1031' TVD and 310' subsea level
Seam: Pittsburgh #8
Owner: Murray Energy / Consolidated Coal Co.

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18)

CASING AND TUBING PROGRAM

| TYPE | Size (in) | New or Used | Grade | Weight per ft. (lb/ft) | FOOTAGE: For Drilling (ft) | INTERVALS: Left in Well (ft) | CEMENT: Fill-up (Cu. Ft.)/CTS |
|--------------|-----------|-------------|-------|------------------------|----------------------------|------------------------------|-------------------------------|
| Conductor | 30" | NEW | BW | BW | 120' | 120' | 259FT^3(CTS) |
| Fresh Water | 13 3/8" | NEW | H40 | 48# | 1,120' | 1,120' | 1128ft^3(CTS) |
| Coal | 13 3/8" | NEW | H40 | 48# | 1,120' | 1,120' | 1128ft^3(CTS) |
| Intermediate | 9 5/8" | NEW | J55 | 36# | 2,803' | 2,803' | 918ft^3(CTS) |
| Production | 5 1/2" | NEW | P110 | 20# | 19,081' | 19,081' | 4873ft^3(CTS) |
| Tubing | 2 3/8" | NEW | N80 | 4.7# | | 7,589' | |
| Liners | | | | | | | |

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| TYPE | Size (in) | Wellbore Diameter (in) | Wall Thickness (in) | Burst Pressure (psi) | Anticipated Max. Internal Pressure (psi) | Cement Type | Cement Yield (cu. ft./k) |
|--------------|-----------|------------------------|---------------------|----------------------|--|-------------|--------------------------|
| Conductor | 30" | 36" | 1.0 | 2,333 | 1,866 | CLASS A | 1.2 |
| Fresh Water | 13 3/8" | 17 1/2" | .33 | 1,730 | 1,384 | SEE #24 | 1.2 |
| Coal | 13 3/8" | 17 1/2" | .33 | 1,730 | 1,384 | 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 | | | |

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WW-6B
(10/14)

API NO. 47- 051 - 01962
OPERATOR WELL NO. Heaven Hill 3-2HM
Well Pad Name: Heaven Hill 3

[Handwritten signature]
3/28/18

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

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

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

Well to be completed with approximately 28,327,500 lb proppant and 437,964 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 18.43

22) Area to be disturbed for well pad only, less access road (acres): 7.15

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.

WW-6B Attachment to #24

Conductor, Coal and Fresh Water Casing Cement:

Premium NE-1 + 2% CaCl

- Premium NE-1 – Class A Portland API Spec
- CaCl – Calcium Chloride

Intermediate Casing:

Premium NE-1 + 2% bwoc CaCl₂ + 46.5% Fresh Water

- Premium NE-1 – Class A Portland API spec
- CaCl₂ – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

Kick Off Plug:

Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L + 38% Fresh Water

- Class H – Increased Compressive Strength Cement
- Sodium Metasilicate – Free Water Control; Early Strength Additive
- R-3 – Cement Retarder
- FP-13L – Anti-Foaming Agent
- CaCl₂ – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

Production Casing Cement:

Lead: 50:50 (Poz:Premium NE-1) + .2% R-3 + .2% MPA-170 + .75 gal/100sk FP-13L

Tail: 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

- Poz – Fly Ash
- Premium NE-1 – Class A Portland API spec
- R-3 – Cement Retarder
- MPA-170 – Gelling Agent
- FP-13L – Anti-Foaming Agent
- ASA-301 – Free Water Control Agent
- BA-10A – Bonding Agent
- ASCA-1 – Solubility Additive

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05/11/2018



Tug Hill Operating, LLC Casing and Cement Program

Heaven Hill 3-2HM

Casing

| | String | Grade | Bit Size | Depth (Measured) | Cement Fill Up |
|--------------|---------|-------|----------------|------------------|----------------|
| Conductor | 30" | BW | 36" | 120' | CTS |
| Surface | 13 3/8" | H40 | 17 1/2" | 1,120' | CTS |
| Intermediate | 9 5/8" | J55 | 12 1/4" | 2,803' | CTS |
| Production | 5 1/2" | P110 | 8 7/8 x 8 3/4" | 19,081' | 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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05/11/2018

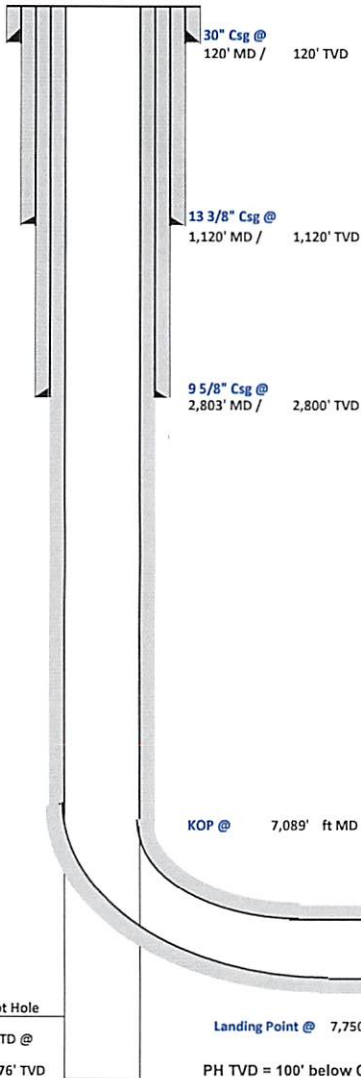


WELL NAME: Heaven Hill 3-2HM
 STATE: West Virginia COUNTY: Marshall
 DISTRICT: Meade
 DF Elev: 1,326' GL Elev: 1,326'
 TD: 19,081'
 TH Latitude: 39.80859199
 TH Longitude: -80.69327779
 BH Latitude: 39.77468933
 BH Longitude: -80.67452012

| FORMATION TOPS | |
|---------------------|-----------|
| Formation | Depth TVD |
| Deepest Fresh Water | 1038 |
| Sewickley Coal | 946 |
| Pittsburgh Coal | 1031 |
| Big Lime | 2060 |
| Weir | 2486 |
| Berea | 2684 |
| Gordon | 2946 |
| Rhinestreet | 6068 |
| Geneseo/Burkett | 6586 |
| Tully | 6617 |
| Hamilton | 6650 |
| Marcellus | 6724 |
| Landing Depth | 6879 |
| Onondaga | 6776 |
| Pilot Hole Depth | 6876 |

| 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 | 1,120' | 1,120' | 48 | H40 | Surface |
| Intermediate 1 | 12 1/4 | 9 5/8 | 2,803' | 2,800' | 36 | J55 | Surface |
| Production | 8 7/8 x 8 3/4 | 5 1/2 | 19,081' | 7,077' | 20 | P110 | Surface |

| CEMENT SUMMARY | | | | DRILLING DETAILS | |
|----------------|-------|-------|---------|------------------|---|
| | Sacks | Class | Density | Fluid Type | Centralizer Notes |
| Conductor | 338 | A | 15.6 | Air | None |
| Surface | 1,142 | A | 15.6 | Air | 3 Centralizers at equal distance |
| Intermediate 1 | 896 | A | 15 | Air | 1 Centralizer every other jt |
| Production | 4,301 | A | 14.5 | Air / SOBM | 1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc |



Handwritten signature and date: 3/28/18

Pilot Hole
 PH TD @ 6,876' TVD
 Landing Point @ 7,750' MD / 6,879' TVD
 PH TVD = 100' below Onondaga Top

Lateral TD @ 19,081' ft MD
 7,077' ft TVD

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51-019142H0D



Well: Heaven Hill 3-2 HM (K)
Site: Heaven Hill 3
Project: Marshall County, West Virginia
Design: rev7

SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | V Sect | Annotation |
|-----|----------|-------|--------|---------|-----------|---------|-------|--------|---------|---------------------------------|
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2 | 1726.00 | 0.00 | 0.00 | 1726.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | KOP Begin 2"/100' build |
| 3 | 1976.00 | 5.00 | 190.00 | 1976.68 | -10.74 | -1.89 | 2.00 | 190.00 | 9.11 | Begin 5.00° tangent |
| 4 | 3130.71 | 5.00 | 190.00 | 3126.00 | -109.85 | -19.37 | 0.00 | 0.00 | 93.21 | Begin 3"/100' build |
| 5 | 4040.28 | 32.28 | 193.19 | 3979.76 | -390.67 | -82.88 | 3.00 | 3.72 | 325.96 | Begin 32.28° tangent |
| 6 | 7089.09 | 32.28 | 193.19 | 6557.42 | -1975.86 | -454.43 | 0.00 | 0.00 | 1634.64 | Begin 10"/100' build/turn |
| 7 | 7749.89 | 89.00 | 150.22 | 6879.00 | -2493.01 | -314.78 | 10.00 | -48.21 | 2164.83 | Begin 89.00° lateral section |
| 8 | 19081.31 | 89.00 | 150.22 | 7077.00 | -12326.32 | 5312.64 | 0.00 | 0.00 | 3422.45 | PBHL/TD 19081.31 MD/7077.00 TVD |

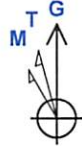


Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level
 Depth Reference: RKB=1326+26 @ 1352.00ust

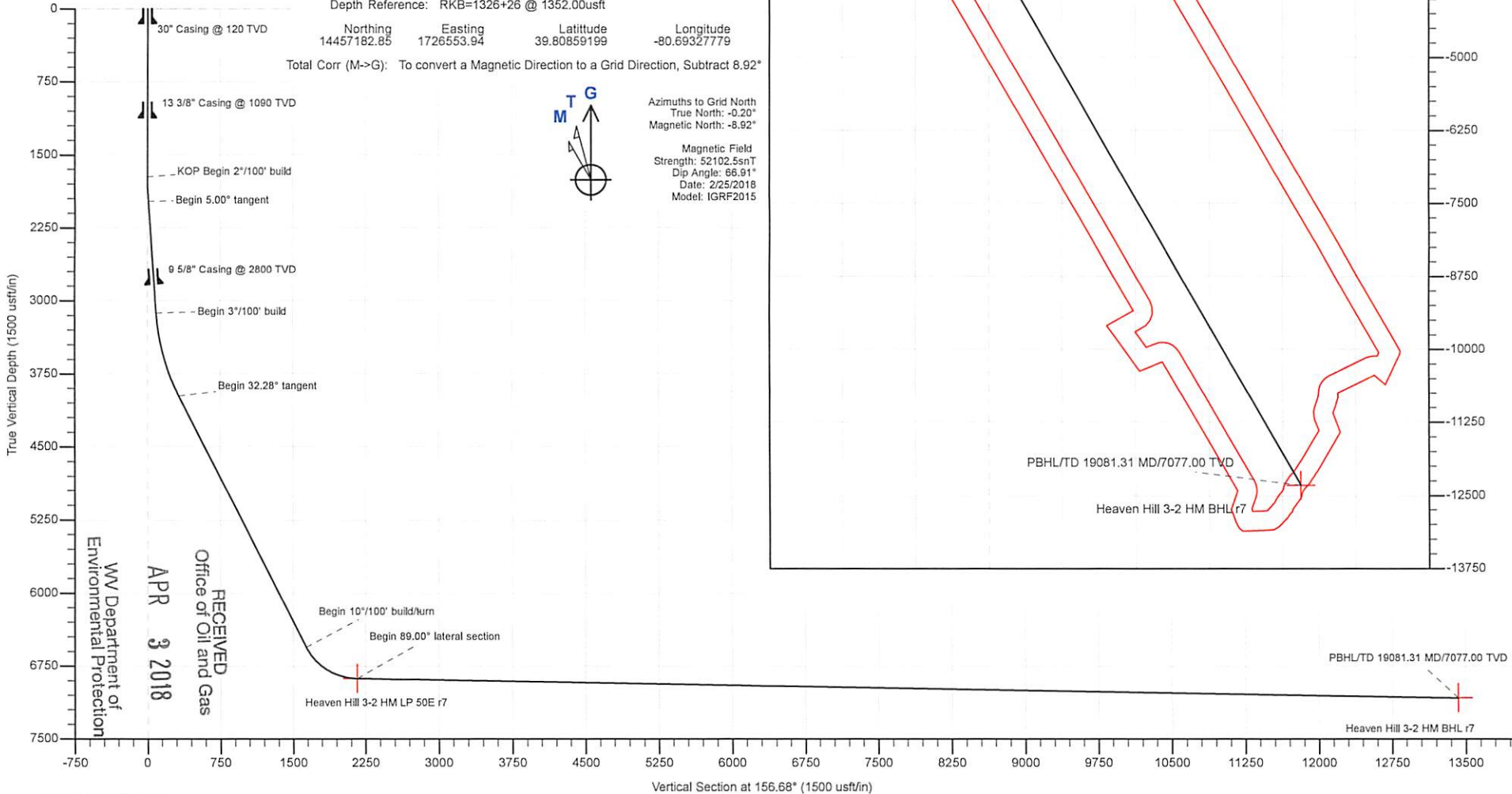
Northing 14457182.85 Easting 1726553.94 Latitude 39.80859199 Longitude -80.69327779

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.92°



Azimuths to Grid North
 True North: -0.20°
 Magnetic North: -8.92°

Magnetic Field
 Strength: 52102.5nT
 Dip Angle: 66.91°
 Date: 2/25/2018
 Model: IGRF2015



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51-01962100



Planning Report - Geographic

51-01962

| | | | |
|-----------|--------------------------------|------------------------------|-----------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Heaven Hill 3-2 HM (K) |
| Company: | Tug Hill Operating LLC | TVD Reference: | RKB=1326+26 @ 1352.00usft |
| Project: | Marshall County, West Virginia | MD Reference: | RKB=1326+26 @ 1352.00usft |
| Site: | Heaven Hill 3 | North Reference: | Grid |
| Well: | Heaven Hill 3-2 HM (K) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev7 | | |

| | | | |
|-------------|--|---------------|----------------|
| 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 | Heaven Hill 3 | | |
| Site Position: | | Northing: | 14,457,178.77 usft |
| From: | Lat/Long | Easting: | 1,726,571.98 usft |
| Position Uncertainty: | 0.00 usft | Slot Radius: | 13-3/16 " |
| | | Latitude: | 39.80858060 |
| | | Longitude: | -80.69321360 |
| | | Grid Convergence: | 0.20 ° |

| | | | |
|----------------------|------------------------|---------------------|---------------|
| Well | Heaven Hill 3-2 HM (K) | | |
| Well Position | +N/-S | 0.00 usft | 0.00 usft |
| | +E/-W | 0.00 usft | 0.00 usft |
| Position Uncertainty | 0.00 usft | Wellhead Elevation: | 0.00 usft |
| | | Latitude: | 39.80859199 |
| | | Longitude: | -80.69327779 |
| | | Ground Level: | 1,326.00 usft |

| | | | | | |
|-----------|---------------|-------------|-----------------|---------------|---------------------|
| Wellbore | Original Hole | | | | |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
| | IGRF2015 | 2/25/2018 | -8.72 | 66.91 | 52,102.45091203 |

| | | | | |
|-------------------|-------------------------|--------------|---------------|---------------|
| Design | rev7 | | | |
| 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 | 156.68 |

| | | | | |
|--------------------------|-----------------|--------------------------------|-----------|----------------|
| Plan Survey Tool Program | Date | 2/25/2018 | | |
| Depth From (usft) | Depth To (usft) | Survey (Wellbore) | Tool Name | Remarks |
| 1 | 0.00 | 19,081.31 rev7 (Original Hole) | MWD | MWD - Standard |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | TFO (°) | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|------------------------|-----------------------|---------|----------------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,726.00 | 0.00 | 0.00 | 1,726.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,976.00 | 5.00 | 190.00 | 1,975.68 | -10.74 | -1.89 | 2.00 | 2.00 | 0.00 | 190.00 | |
| 3,130.71 | 5.00 | 190.00 | 3,126.00 | -109.85 | -19.37 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4,040.28 | 32.28 | 193.19 | 3,979.76 | -390.67 | -82.88 | 3.00 | 3.00 | 0.35 | 3.72 | |
| 7,089.09 | 32.28 | 193.19 | 6,557.42 | -1,975.86 | -454.43 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,749.90 | 89.00 | 150.22 | 6,879.00 | -2,493.01 | -314.78 | 10.00 | 8.58 | -6.50 | -48.21 | Heaven Hill 3-2 HM L |
| 19,081.31 | 89.00 | 150.22 | 7,077.00 | -12,326.32 | 5,312.64 | 0.00 | 0.00 | 0.00 | 0.00 | Heaven Hill 3-2 HM B |

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Planning Report - Geographic

51-01962 MOD

| | | | |
|------------------|--------------------------------|-------------------------------------|-----------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Heaven Hill 3-2 HM (K) |
| Company: | Tug Hill Operating LLC | TVD Reference: | RKB=1326+26 @ 1352.00usft |
| Project: | Marshall County, West Virginia | MD Reference: | RKB=1326+26 @ 1352.00usft |
| Site: | Heaven Hill 3 | North Reference: | Grid |
| Well: | Heaven Hill 3-2 HM (K) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev7 | | |

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| Planned Survey | | | | | | | | | | WV Department of Environmental Protection |
|--------------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|---------------------------|--------------------------|-------------|--------------|--|
| 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 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 900.00 | 0.00 | 0.00 | 900.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,000.00 | 0.00 | 0.00 | 1,000.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,100.00 | 0.00 | 0.00 | 1,100.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,200.00 | 0.00 | 0.00 | 1,200.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,300.00 | 0.00 | 0.00 | 1,300.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,400.00 | 0.00 | 0.00 | 1,400.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,500.00 | 0.00 | 0.00 | 1,500.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,600.00 | 0.00 | 0.00 | 1,600.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,700.00 | 0.00 | 0.00 | 1,700.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| 1,726.00 | 0.00 | 0.00 | 1,726.00 | 0.00 | 0.00 | 14,457,182.85 | 1,726,553.94 | 39.80859199 | -80.69327779 | |
| KOP Begin 2°/100' build | | | | | | | | | | |
| 1,800.00 | 1.48 | 190.00 | 1,799.99 | -0.94 | -0.17 | 14,457,181.91 | 1,726,553.78 | 39.80858941 | -80.69327839 | |
| 1,900.00 | 3.48 | 190.00 | 1,899.89 | -5.20 | -0.92 | 14,457,177.65 | 1,726,553.03 | 39.80857771 | -80.69328112 | |
| 1,976.00 | 5.00 | 190.00 | 1,975.68 | -10.74 | -1.89 | 14,457,172.12 | 1,726,552.05 | 39.80856253 | -80.69328466 | |
| Begin 5.00° tangent | | | | | | | | | | |
| 2,000.00 | 5.00 | 190.00 | 1,999.59 | -12.80 | -2.26 | 14,457,170.06 | 1,726,551.69 | 39.80855687 | -80.69328598 | |
| 2,100.00 | 5.00 | 190.00 | 2,099.21 | -21.38 | -3.77 | 14,457,161.47 | 1,726,550.17 | 39.80853332 | -80.69329147 | |
| 2,200.00 | 5.00 | 190.00 | 2,198.83 | -29.96 | -5.28 | 14,457,152.89 | 1,726,548.66 | 39.80850976 | -80.69329696 | |
| 2,300.00 | 5.00 | 190.00 | 2,298.45 | -38.55 | -6.80 | 14,457,144.31 | 1,726,547.15 | 39.80848620 | -80.69330246 | |
| 2,400.00 | 5.00 | 190.00 | 2,398.07 | -47.13 | -8.31 | 14,457,135.72 | 1,726,545.63 | 39.80846264 | -80.69330796 | |
| 2,500.00 | 5.00 | 190.00 | 2,497.69 | -55.71 | -9.82 | 14,457,127.14 | 1,726,544.12 | 39.80843909 | -80.69331345 | |
| 2,600.00 | 5.00 | 190.00 | 2,597.31 | -64.29 | -11.34 | 14,457,118.56 | 1,726,542.61 | 39.80841553 | -80.69331894 | |
| 2,700.00 | 5.00 | 190.00 | 2,696.93 | -72.88 | -12.85 | 14,457,109.97 | 1,726,541.09 | 39.80839197 | -80.69332444 | |
| 2,800.00 | 5.00 | 190.00 | 2,796.55 | -81.46 | -14.36 | 14,457,101.39 | 1,726,539.58 | 39.80836842 | -80.69332993 | |
| 2,900.00 | 5.00 | 190.00 | 2,896.17 | -90.04 | -15.88 | 14,457,092.81 | 1,726,538.07 | 39.80834486 | -80.69333542 | |
| 3,000.00 | 5.00 | 190.00 | 2,995.79 | -98.63 | -17.39 | 14,457,084.22 | 1,726,536.55 | 39.80832130 | -80.69334092 | |
| 3,100.00 | 5.00 | 190.00 | 3,095.41 | -107.21 | -18.90 | 14,457,075.64 | 1,726,535.04 | 39.80829774 | -80.69334641 | |
| 3,130.71 | 5.00 | 190.00 | 3,126.00 | -109.85 | -19.37 | 14,457,073.01 | 1,726,534.57 | 39.80829051 | -80.69334810 | |
| Begin 3°/100' build | | | | | | | | | | |
| 3,200.00 | 7.08 | 191.09 | 3,194.90 | -117.01 | -20.71 | 14,457,065.84 | 1,726,533.23 | 39.80827085 | -80.69335298 | |
| 3,300.00 | 10.07 | 191.88 | 3,293.77 | -131.61 | -23.70 | 14,457,051.24 | 1,726,530.24 | 39.80823077 | -80.69336379 | |
| 3,400.00 | 13.07 | 192.31 | 3,391.73 | -151.23 | -27.91 | 14,457,031.63 | 1,726,526.03 | 39.80817695 | -80.69337903 | |
| 3,500.00 | 16.07 | 192.58 | 3,488.50 | -175.79 | -33.34 | 14,457,007.06 | 1,726,520.60 | 39.80810955 | -80.69339865 | |
| 3,600.00 | 19.07 | 192.77 | 3,583.82 | -205.24 | -39.97 | 14,456,977.61 | 1,726,513.98 | 39.80802873 | -80.69342261 | |
| 3,700.00 | 22.07 | 192.91 | 3,677.44 | -239.49 | -47.77 | 14,456,943.36 | 1,726,506.17 | 39.80793474 | -80.69345083 | |
| 3,800.00 | 25.07 | 193.01 | 3,769.08 | -278.46 | -56.74 | 14,456,904.40 | 1,726,497.20 | 39.80782782 | -80.69348324 | |
| 3,900.00 | 28.07 | 193.10 | 3,858.51 | -322.02 | -66.85 | 14,456,860.83 | 1,726,487.10 | 39.80770826 | -80.69351975 | |
| 4,000.00 | 31.07 | 193.17 | 3,945.48 | -370.08 | -78.06 | 14,456,812.78 | 1,726,475.88 | 39.80757641 | -80.69356025 | |
| 4,040.28 | 32.28 | 193.19 | 3,979.76 | -390.67 | -82.88 | 14,456,792.18 | 1,726,471.06 | 39.80751990 | -80.69357768 | |
| Begin 32.28° tangent | | | | | | | | | | |
| 4,100.00 | 32.28 | 193.19 | 4,030.25 | -421.72 | -90.16 | 14,456,761.13 | 1,726,463.78 | 39.80743470 | -80.69360397 | |
| 4,200.00 | 32.28 | 193.19 | 4,114.79 | -473.71 | -102.35 | 14,456,709.14 | 1,726,451.60 | 39.80729202 | -80.69364800 | |
| 4,300.00 | 32.28 | 193.19 | 4,199.34 | -525.71 | -114.53 | 14,456,657.14 | 1,726,439.41 | 39.80714935 | -80.69369202 | |
| 4,400.00 | 32.28 | 193.19 | 4,283.89 | -577.70 | -126.72 | 14,456,605.15 | 1,726,427.22 | 39.80700668 | -80.69373605 | |
| 4,500.00 | 32.28 | 193.19 | 4,368.43 | -629.69 | -138.91 | 14,456,553.16 | 1,726,415.04 | 39.80686400 | -80.69378008 | |

51-01962
MON



Planning Report - Geographic

| | | | |
|------------------|--------------------------------|-------------------------------------|-----------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Heaven Hill 3-2 HM (K) |
| Company: | Tug Hill Operating LLC | TVD Reference: | RKB=1326+26 @ 1352.00usft |
| Project: | Marshall County, West Virginia | MD Reference: | RKB=1326+26 @ 1352.00usft |
| Site: | Heaven Hill 3 | North Reference: | Grid |
| Well: | Heaven Hill 3-2 HM (K) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev7 | | |

Office of Oil and Gas
APR 3 2018

| Planned Survey | | | | | | | | | | |
|-------------------------------------|-----------------|-------------|-----------------------|-------------|-------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N-S (usft) | +E-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 4,600.00 | 32.28 | 193.19 | 4,452.98 | -681.69 | -151.09 | 14,456,501.16 | 1,726,402.85 | 39.80672133 | -80.69382411 | |
| 4,700.00 | 32.28 | 193.19 | 4,537.53 | -733.68 | -163.28 | 14,456,449.17 | 1,726,390.66 | 39.80657866 | -80.69386813 | |
| 4,800.00 | 32.28 | 193.19 | 4,622.07 | -785.68 | -175.47 | 14,456,397.18 | 1,726,378.48 | 39.80643598 | -80.69391216 | |
| 4,900.00 | 32.28 | 193.19 | 4,706.62 | -837.67 | -187.65 | 14,456,345.18 | 1,726,366.29 | 39.80629331 | -80.69395619 | |
| 5,000.00 | 32.28 | 193.19 | 4,791.17 | -889.66 | -199.84 | 14,456,293.19 | 1,726,354.10 | 39.80615064 | -80.69400021 | |
| 5,100.00 | 32.28 | 193.19 | 4,875.71 | -941.66 | -212.03 | 14,456,241.19 | 1,726,341.92 | 39.80600796 | -80.69404424 | |
| 5,200.00 | 32.28 | 193.19 | 4,960.26 | -993.65 | -224.21 | 14,456,189.20 | 1,726,329.73 | 39.80586529 | -80.69408827 | |
| 5,300.00 | 32.28 | 193.19 | 5,044.81 | -1,045.65 | -236.40 | 14,456,137.21 | 1,726,317.54 | 39.80572261 | -80.69413229 | |
| 5,400.00 | 32.28 | 193.19 | 5,129.35 | -1,097.64 | -248.59 | 14,456,085.21 | 1,726,305.35 | 39.80557994 | -80.69417632 | |
| 5,500.00 | 32.28 | 193.19 | 5,213.90 | -1,149.63 | -260.77 | 14,456,033.22 | 1,726,293.17 | 39.80543727 | -80.69422034 | |
| 5,600.00 | 32.28 | 193.19 | 5,298.45 | -1,201.63 | -272.96 | 14,455,981.22 | 1,726,280.98 | 39.80529459 | -80.69426437 | |
| 5,700.00 | 32.28 | 193.19 | 5,382.99 | -1,253.62 | -285.15 | 14,455,929.23 | 1,726,268.79 | 39.80515192 | -80.69430840 | |
| 5,800.00 | 32.28 | 193.19 | 5,467.54 | -1,305.61 | -297.34 | 14,455,877.24 | 1,726,256.61 | 39.80500925 | -80.69435242 | |
| 5,900.00 | 32.28 | 193.19 | 5,552.09 | -1,357.61 | -309.52 | 14,455,825.24 | 1,726,244.42 | 39.80486657 | -80.69439645 | |
| 6,000.00 | 32.28 | 193.19 | 5,636.63 | -1,409.60 | -321.71 | 14,455,773.25 | 1,726,232.23 | 39.80472390 | -80.69444047 | |
| 6,100.00 | 32.28 | 193.19 | 5,721.18 | -1,461.60 | -333.90 | 14,455,721.26 | 1,726,220.05 | 39.80458123 | -80.69448449 | |
| 6,200.00 | 32.28 | 193.19 | 5,805.73 | -1,513.59 | -346.08 | 14,455,669.26 | 1,726,207.86 | 39.80443855 | -80.69452852 | |
| 6,300.00 | 32.28 | 193.19 | 5,890.27 | -1,565.58 | -358.27 | 14,455,617.27 | 1,726,195.67 | 39.80429588 | -80.69457254 | |
| 6,400.00 | 32.28 | 193.19 | 5,974.82 | -1,617.58 | -370.46 | 14,455,565.27 | 1,726,183.49 | 39.80415321 | -80.69461657 | |
| 6,500.00 | 32.28 | 193.19 | 6,059.37 | -1,669.57 | -382.64 | 14,455,513.28 | 1,726,171.30 | 39.80401053 | -80.69466059 | |
| 6,600.00 | 32.28 | 193.19 | 6,143.91 | -1,721.57 | -394.83 | 14,455,461.29 | 1,726,159.11 | 39.80386786 | -80.69470461 | |
| 6,700.00 | 32.28 | 193.19 | 6,228.46 | -1,773.56 | -407.02 | 14,455,409.29 | 1,726,146.93 | 39.80372518 | -80.69474864 | |
| 6,800.00 | 32.28 | 193.19 | 6,313.01 | -1,825.55 | -419.20 | 14,455,357.30 | 1,726,134.74 | 39.80358251 | -80.69479266 | |
| 6,900.00 | 32.28 | 193.19 | 6,397.55 | -1,877.55 | -431.39 | 14,455,305.31 | 1,726,122.55 | 39.80343984 | -80.69483668 | |
| 7,000.00 | 32.28 | 193.19 | 6,482.10 | -1,929.54 | -443.58 | 14,455,253.31 | 1,726,110.37 | 39.80329716 | -80.69488071 | |
| 7,089.09 | 32.28 | 193.19 | 6,557.42 | -1,975.86 | -454.43 | 14,455,206.99 | 1,726,099.51 | 39.80317005 | -80.69491993 | |
| Begin 10°/100' build/turn | | | | | | | | | | |
| 7,100.00 | 33.01 | 191.70 | 6,566.61 | -1,981.61 | -455.70 | 14,455,201.24 | 1,726,098.24 | 39.80315428 | -80.69492451 | |
| 7,200.00 | 40.43 | 180.41 | 6,646.80 | -2,040.86 | -461.47 | 14,455,141.99 | 1,726,092.47 | 39.80299162 | -80.69494578 | |
| 7,300.00 | 48.64 | 172.25 | 6,718.08 | -2,110.65 | -456.63 | 14,455,072.20 | 1,726,097.31 | 39.80279992 | -80.69492939 | |
| 7,400.00 | 57.30 | 165.96 | 6,778.28 | -2,188.85 | -441.33 | 14,454,994.00 | 1,726,112.62 | 39.80258500 | -80.69487584 | |
| 7,500.00 | 66.22 | 160.81 | 6,825.58 | -2,273.10 | -416.02 | 14,454,909.75 | 1,726,137.92 | 39.80235341 | -80.69478676 | |
| 7,600.00 | 75.28 | 156.33 | 6,858.53 | -2,360.82 | -381.48 | 14,454,822.03 | 1,726,172.46 | 39.80211217 | -80.69466485 | |
| 7,700.00 | 84.42 | 152.21 | 6,876.14 | -2,449.37 | -338.76 | 14,454,733.49 | 1,726,215.18 | 39.80186861 | -80.69451382 | |
| 7,749.89 | 89.00 | 150.22 | 6,879.00 | -2,493.00 | -314.78 | 14,454,689.85 | 1,726,239.16 | 39.80174855 | -80.69442898 | |
| Begin 89.00° lateral section | | | | | | | | | | |
| 7,800.00 | 89.00 | 150.22 | 6,879.88 | -2,536.49 | -289.90 | 14,454,646.36 | 1,726,264.05 | 39.80162889 | -80.69434090 | |
| 7,900.00 | 89.00 | 150.22 | 6,881.62 | -2,623.27 | -240.23 | 14,454,559.58 | 1,726,313.71 | 39.80139011 | -80.69416514 | |
| 8,000.00 | 89.00 | 150.22 | 6,883.37 | -2,710.05 | -190.57 | 14,454,472.80 | 1,726,363.37 | 39.80115132 | -80.69398938 | |
| 8,100.00 | 89.00 | 150.22 | 6,885.12 | -2,796.83 | -140.91 | 14,454,386.03 | 1,726,413.03 | 39.80091254 | -80.69381362 | |
| 8,200.00 | 89.00 | 150.22 | 6,886.87 | -2,883.61 | -91.25 | 14,454,299.25 | 1,726,462.69 | 39.80067376 | -80.69363786 | |
| 8,300.00 | 89.00 | 150.22 | 6,888.61 | -2,970.38 | -41.59 | 14,454,212.47 | 1,726,512.36 | 39.80043497 | -80.69346210 | |
| 8,400.00 | 89.00 | 150.22 | 6,890.36 | -3,057.16 | 8.08 | 14,454,125.69 | 1,726,562.02 | 39.80019619 | -80.69328634 | |
| 8,500.00 | 89.00 | 150.22 | 6,892.11 | -3,143.94 | 57.74 | 14,454,038.91 | 1,726,611.68 | 39.79995740 | -80.69311058 | |
| 8,600.00 | 89.00 | 150.22 | 6,893.85 | -3,230.72 | 107.40 | 14,453,952.13 | 1,726,661.34 | 39.79971862 | -80.69293483 | |
| 8,700.00 | 89.00 | 150.22 | 6,895.60 | -3,317.50 | 157.06 | 14,453,865.35 | 1,726,711.00 | 39.79947983 | -80.69275907 | |
| 8,800.00 | 89.00 | 150.22 | 6,897.35 | -3,404.28 | 206.72 | 14,453,778.57 | 1,726,760.67 | 39.79924105 | -80.69258332 | |
| 8,900.00 | 89.00 | 150.22 | 6,899.10 | -3,491.06 | 256.39 | 14,453,691.79 | 1,726,810.33 | 39.79900226 | -80.69240757 | |
| 9,000.00 | 89.00 | 150.22 | 6,900.84 | -3,577.84 | 306.05 | 14,453,605.01 | 1,726,859.99 | 39.79876348 | -80.69223182 | |
| 9,100.00 | 89.00 | 150.22 | 6,902.59 | -3,664.62 | 355.71 | 14,453,518.23 | 1,726,909.65 | 39.79852469 | -80.69205607 | |
| 9,200.00 | 89.00 | 150.22 | 6,904.34 | -3,751.40 | 405.37 | 14,453,431.45 | 1,726,959.32 | 39.79828590 | -80.69188032 | |
| 9,300.00 | 89.00 | 150.22 | 6,906.09 | -3,838.18 | 455.03 | 14,453,344.68 | 1,727,008.98 | 39.79804712 | -80.69170458 | |
| 9,400.00 | 89.00 | 150.22 | 6,907.83 | -3,924.96 | 504.70 | 14,453,257.90 | 1,727,058.64 | 39.79780833 | -80.69152883 | |
| 9,500.00 | 89.00 | 150.22 | 6,909.58 | -4,011.73 | 554.36 | 14,453,171.12 | 1,727,108.30 | 39.79756954 | -80.69135309 | |

51-01962
MOD



Planning Report - Geographic

| | | | |
|------------------|--------------------------------|-------------------------------------|-----------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Heaven Hill 3-2 HM (K) |
| Company: | Tug Hill Operating LLC | TVD Reference: | RKB=1326+26 @ 1352.00usft |
| Project: | Marshall County, West Virginia | MD Reference: | RKB=1326+26 @ 1352.00usft |
| Site: | Heaven Hill 3 | North Reference: | Grid |
| Well: | Heaven Hill 3-2 HM (K) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev7 | | |

| Planned Survey | | | | | | | | | | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 9,600.00 | 89.00 | 150.22 | 6,911.33 | -4,098.51 | 604.02 | 14,453,084.34 | 1,727,157.96 | 39.79733076 | -80.69117734 | |
| 9,700.00 | 89.00 | 150.22 | 6,913.08 | -4,185.29 | 653.68 | 14,452,997.56 | 1,727,207.63 | 39.79709197 | -80.69100160 | |
| 9,800.00 | 89.00 | 150.22 | 6,914.82 | -4,272.07 | 703.35 | 14,452,910.78 | 1,727,257.29 | 39.79685318 | -80.69082586 | |
| 9,900.00 | 89.00 | 150.22 | 6,916.57 | -4,358.85 | 753.01 | 14,452,824.00 | 1,727,306.95 | 39.79661439 | -80.69065012 | |
| 10,000.00 | 89.00 | 150.22 | 6,918.32 | -4,445.63 | 802.67 | 14,452,737.22 | 1,727,356.61 | 39.79637560 | -80.69047439 | |
| 10,100.00 | 89.00 | 150.22 | 6,920.06 | -4,532.41 | 852.33 | 14,452,650.44 | 1,727,406.27 | 39.79613681 | -80.69029865 | |
| 10,200.00 | 89.00 | 150.22 | 6,921.81 | -4,619.19 | 901.99 | 14,452,563.66 | 1,727,455.94 | 39.79589802 | -80.69012291 | |
| 10,300.00 | 89.00 | 150.22 | 6,923.56 | -4,705.97 | 951.66 | 14,452,476.88 | 1,727,505.60 | 39.79565923 | -80.68994718 | |
| 10,400.00 | 89.00 | 150.22 | 6,925.31 | -4,792.75 | 1,001.32 | 14,452,390.10 | 1,727,555.26 | 39.79542044 | -80.68977144 | |
| 10,500.00 | 89.00 | 150.22 | 6,927.05 | -4,879.53 | 1,050.98 | 14,452,303.33 | 1,727,604.92 | 39.79518165 | -80.68959571 | |
| 10,600.00 | 89.00 | 150.22 | 6,928.80 | -4,966.31 | 1,100.64 | 14,452,216.55 | 1,727,654.58 | 39.79494286 | -80.68941998 | |
| 10,700.00 | 89.00 | 150.22 | 6,930.55 | -5,053.08 | 1,150.30 | 14,452,129.77 | 1,727,704.25 | 39.79470407 | -80.68924425 | |
| 10,800.00 | 89.00 | 150.22 | 6,932.30 | -5,139.86 | 1,199.97 | 14,452,042.99 | 1,727,753.91 | 39.79446528 | -80.68906852 | |
| 10,900.00 | 89.00 | 150.22 | 6,934.04 | -5,226.64 | 1,249.63 | 14,451,956.21 | 1,727,803.57 | 39.79422649 | -80.68889280 | |
| 11,000.00 | 89.00 | 150.22 | 6,935.79 | -5,313.42 | 1,299.29 | 14,451,869.43 | 1,727,853.23 | 39.79398770 | -80.68871707 | |
| 11,100.00 | 89.00 | 150.22 | 6,937.54 | -5,400.20 | 1,348.95 | 14,451,782.65 | 1,727,902.90 | 39.79374891 | -80.68854135 | |
| 11,200.00 | 89.00 | 150.22 | 6,939.29 | -5,486.98 | 1,398.61 | 14,451,695.87 | 1,727,952.56 | 39.79351012 | -80.68836562 | |
| 11,300.00 | 89.00 | 150.22 | 6,941.03 | -5,573.76 | 1,448.28 | 14,451,609.09 | 1,728,002.22 | 39.79327132 | -80.68818990 | |
| 11,400.00 | 89.00 | 150.22 | 6,942.78 | -5,660.54 | 1,497.94 | 14,451,522.31 | 1,728,051.88 | 39.79303253 | -80.68801418 | |
| 11,500.00 | 89.00 | 150.22 | 6,944.53 | -5,747.32 | 1,547.60 | 14,451,435.53 | 1,728,101.54 | 39.79279374 | -80.68783846 | |
| 11,600.00 | 89.00 | 150.22 | 6,946.28 | -5,834.10 | 1,597.26 | 14,451,348.75 | 1,728,151.21 | 39.79255495 | -80.68766274 | |
| 11,700.00 | 89.00 | 150.22 | 6,948.02 | -5,920.88 | 1,646.93 | 14,451,261.98 | 1,728,200.87 | 39.79231615 | -80.68748702 | |
| 11,800.00 | 89.00 | 150.22 | 6,949.77 | -6,007.66 | 1,696.59 | 14,451,175.20 | 1,728,250.53 | 39.79207736 | -80.68731131 | |
| 11,900.00 | 89.00 | 150.22 | 6,951.52 | -6,094.43 | 1,746.25 | 14,451,088.42 | 1,728,300.19 | 39.79183856 | -80.68713559 | |
| 12,000.00 | 89.00 | 150.22 | 6,953.26 | -6,181.21 | 1,795.91 | 14,451,001.64 | 1,728,349.85 | 39.79159977 | -80.68695988 | |
| 12,100.00 | 89.00 | 150.22 | 6,955.01 | -6,267.99 | 1,845.57 | 14,450,914.86 | 1,728,399.52 | 39.79136098 | -80.68678417 | |
| 12,200.00 | 89.00 | 150.22 | 6,956.76 | -6,354.77 | 1,895.24 | 14,450,828.08 | 1,728,449.18 | 39.79112218 | -80.68660845 | |
| 12,300.00 | 89.00 | 150.22 | 6,958.51 | -6,441.55 | 1,944.90 | 14,450,741.30 | 1,728,498.84 | 39.79088339 | -80.68643274 | |
| 12,400.00 | 89.00 | 150.22 | 6,960.25 | -6,528.33 | 1,994.56 | 14,450,654.52 | 1,728,548.50 | 39.79064459 | -80.68625703 | |
| 12,500.00 | 89.00 | 150.22 | 6,962.00 | -6,615.11 | 2,044.22 | 14,450,567.74 | 1,728,598.16 | 39.79040580 | -80.68608133 | |
| 12,600.00 | 89.00 | 150.22 | 6,963.75 | -6,701.89 | 2,093.88 | 14,450,480.96 | 1,728,647.83 | 39.79016700 | -80.68590562 | |
| 12,700.00 | 89.00 | 150.22 | 6,965.50 | -6,788.67 | 2,143.55 | 14,450,394.18 | 1,728,697.49 | 39.78992820 | -80.68572992 | |
| 12,800.00 | 89.00 | 150.22 | 6,967.24 | -6,875.45 | 2,193.21 | 14,450,307.40 | 1,728,747.15 | 39.78968941 | -80.68555421 | |
| 12,900.00 | 89.00 | 150.22 | 6,968.99 | -6,962.23 | 2,242.87 | 14,450,220.63 | 1,728,796.81 | 39.78945061 | -80.68537851 | |
| 13,000.00 | 89.00 | 150.22 | 6,970.74 | -7,049.01 | 2,292.53 | 14,450,133.85 | 1,728,846.48 | 39.78921181 | -80.68520281 | |
| 13,100.00 | 89.00 | 150.22 | 6,972.49 | -7,135.78 | 2,342.19 | 14,450,047.07 | 1,728,896.14 | 39.78897302 | -80.68502711 | |
| 13,200.00 | 89.00 | 150.22 | 6,974.23 | -7,222.56 | 2,391.86 | 14,449,960.29 | 1,728,945.80 | 39.78873422 | -80.68485141 | |
| 13,300.00 | 89.00 | 150.22 | 6,975.98 | -7,309.34 | 2,441.52 | 14,449,873.51 | 1,728,995.46 | 39.78849542 | -80.68467571 | |
| 13,400.00 | 89.00 | 150.22 | 6,977.73 | -7,396.12 | 2,491.18 | 14,449,786.73 | 1,729,045.12 | 39.78825662 | -80.68450001 | |
| 13,500.00 | 89.00 | 150.22 | 6,979.47 | -7,482.90 | 2,540.84 | 14,449,699.95 | 1,729,094.79 | 39.78801783 | -80.68432432 | |
| 13,600.00 | 89.00 | 150.22 | 6,981.22 | -7,569.68 | 2,590.51 | 14,449,613.17 | 1,729,144.45 | 39.78777903 | -80.68414862 | |
| 13,700.00 | 89.00 | 150.22 | 6,982.97 | -7,656.46 | 2,640.17 | 14,449,526.39 | 1,729,194.11 | 39.78754023 | -80.68397293 | |
| 13,800.00 | 89.00 | 150.22 | 6,984.72 | -7,743.24 | 2,689.83 | 14,449,439.61 | 1,729,243.77 | 39.78730143 | -80.68379724 | |
| 13,900.00 | 89.00 | 150.22 | 6,986.46 | -7,830.02 | 2,739.49 | 14,449,352.83 | 1,729,293.43 | 39.78706263 | -80.68362155 | |
| 14,000.00 | 89.00 | 150.22 | 6,988.21 | -7,916.80 | 2,789.15 | 14,449,266.05 | 1,729,343.10 | 39.78682383 | -80.68344586 | |
| 14,100.00 | 89.00 | 150.22 | 6,989.96 | -8,003.58 | 2,838.82 | 14,449,179.28 | 1,729,392.76 | 39.78658503 | -80.68327017 | |
| 14,200.00 | 89.00 | 150.22 | 6,991.71 | -8,090.36 | 2,888.48 | 14,449,092.50 | 1,729,442.42 | 39.78634623 | -80.68309448 | |
| 14,300.00 | 89.00 | 150.22 | 6,993.45 | -8,177.13 | 2,938.14 | 14,449,005.72 | 1,729,492.08 | 39.78610743 | -80.68291879 | |
| 14,400.00 | 89.00 | 150.22 | 6,995.20 | -8,263.91 | 2,987.80 | 14,448,918.94 | 1,729,541.74 | 39.78586863 | -80.68274311 | |
| 14,500.00 | 89.00 | 150.22 | 6,996.95 | -8,350.69 | 3,037.46 | 14,448,832.16 | 1,729,591.41 | 39.78562983 | -80.68256743 | |
| 14,600.00 | 89.00 | 150.22 | 6,998.70 | -8,437.47 | 3,087.13 | 14,448,745.38 | 1,729,641.07 | 39.78539103 | -80.68239174 | |
| 14,700.00 | 89.00 | 150.22 | 7,000.44 | -8,524.25 | 3,136.79 | 14,448,658.60 | 1,729,690.73 | 39.78515223 | -80.68221606 | |
| 14,800.00 | 89.00 | 150.22 | 7,002.19 | -8,611.03 | 3,186.45 | 14,448,571.82 | 1,729,740.39 | 39.78491342 | -80.68204038 | |
| 14,900.00 | 89.00 | 150.22 | 7,003.94 | -8,697.81 | 3,236.11 | 14,448,485.04 | 1,729,790.06 | 39.78467462 | -80.68186470 | |
| 15,000.00 | 89.00 | 150.22 | 7,005.69 | -8,784.59 | 3,285.77 | 14,448,398.26 | 1,729,839.72 | 39.78443582 | -80.68168903 | |



Planning Report - Geographic

| | | | |
|------------------|--------------------------------|-------------------------------------|-----------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Heaven Hill 3-2 HM (K) |
| Company: | Tug Hill Operating LLC | TVD Reference: | RKB=1326+26 @ 1352.00usft |
| Project: | Marshall County, West Virginia | MD Reference: | RKB=1326+26 @ 1352.00usft |
| Site: | Heaven Hill 3 | North Reference: | Grid |
| Well: | Heaven Hill 3-2 HM (K) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev7 | | |

| Planned Survey | | | | | | | | | | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 15,100.00 | 89.00 | 150.22 | 7,007.43 | -8,871.37 | 3,335.44 | 14,448,311.48 | 1,729,889.38 | 39.78419702 | -80.68151335 | |
| 15,200.00 | 89.00 | 150.22 | 7,009.18 | -8,958.15 | 3,385.10 | 14,448,224.70 | 1,729,939.04 | 39.78395822 | -80.68133767 | |
| 15,300.00 | 89.00 | 150.22 | 7,010.93 | -9,044.93 | 3,434.76 | 14,448,137.93 | 1,729,988.70 | 39.78371941 | -80.68116200 | |
| 15,400.00 | 89.00 | 150.22 | 7,012.67 | -9,131.71 | 3,484.42 | 14,448,051.15 | 1,730,038.37 | 39.78348061 | -80.68098633 | |
| 15,500.00 | 89.00 | 150.22 | 7,014.42 | -9,218.48 | 3,534.09 | 14,447,964.37 | 1,730,088.03 | 39.78324181 | -80.68081066 | |
| 15,600.00 | 89.00 | 150.22 | 7,016.17 | -9,305.26 | 3,583.75 | 14,447,877.59 | 1,730,137.69 | 39.78300300 | -80.68063499 | |
| 15,700.00 | 89.00 | 150.22 | 7,017.92 | -9,392.04 | 3,633.41 | 14,447,790.81 | 1,730,187.35 | 39.78276420 | -80.68045932 | |
| 15,800.00 | 89.00 | 150.22 | 7,019.66 | -9,478.82 | 3,683.07 | 14,447,704.03 | 1,730,237.01 | 39.78252539 | -80.68028365 | |
| 15,900.00 | 89.00 | 150.22 | 7,021.41 | -9,565.60 | 3,732.73 | 14,447,617.25 | 1,730,286.68 | 39.78228659 | -80.68010798 | |
| 16,000.00 | 89.00 | 150.22 | 7,023.16 | -9,652.38 | 3,782.40 | 14,447,530.47 | 1,730,336.34 | 39.78204778 | -80.67993232 | |
| 16,100.00 | 89.00 | 150.22 | 7,024.91 | -9,739.16 | 3,832.06 | 14,447,443.69 | 1,730,386.00 | 39.78180898 | -80.67975665 | |
| 16,200.00 | 89.00 | 150.22 | 7,026.65 | -9,825.94 | 3,881.72 | 14,447,356.91 | 1,730,435.66 | 39.78157017 | -80.67958099 | |
| 16,300.00 | 89.00 | 150.22 | 7,028.40 | -9,912.72 | 3,931.38 | 14,447,270.13 | 1,730,485.32 | 39.78133137 | -80.67940533 | |
| 16,400.00 | 89.00 | 150.22 | 7,030.15 | -9,999.50 | 3,981.04 | 14,447,183.36 | 1,730,534.99 | 39.78109256 | -80.67922967 | |
| 16,500.00 | 89.00 | 150.22 | 7,031.90 | -10,086.28 | 4,030.71 | 14,447,096.58 | 1,730,584.65 | 39.78085375 | -80.67905401 | |
| 16,600.00 | 89.00 | 150.22 | 7,033.64 | -10,173.06 | 4,080.37 | 14,447,009.80 | 1,730,634.31 | 39.78061495 | -80.67887835 | |
| 16,700.00 | 89.00 | 150.22 | 7,035.39 | -10,259.83 | 4,130.03 | 14,446,923.02 | 1,730,683.97 | 39.78037614 | -80.67870269 | |
| 16,800.00 | 89.00 | 150.22 | 7,037.14 | -10,346.61 | 4,179.69 | 14,446,836.24 | 1,730,733.64 | 39.78013733 | -80.67852704 | |
| 16,900.00 | 89.00 | 150.22 | 7,038.88 | -10,433.39 | 4,229.35 | 14,446,749.46 | 1,730,783.30 | 39.77989853 | -80.67835138 | |
| 17,000.00 | 89.00 | 150.22 | 7,040.63 | -10,520.17 | 4,279.02 | 14,446,662.68 | 1,730,832.96 | 39.77965972 | -80.67817573 | |
| 17,100.00 | 89.00 | 150.22 | 7,042.38 | -10,606.95 | 4,328.68 | 14,446,575.90 | 1,730,882.62 | 39.77942091 | -80.67800008 | |
| 17,200.00 | 89.00 | 150.22 | 7,044.13 | -10,693.73 | 4,378.34 | 14,446,489.12 | 1,730,932.28 | 39.77918210 | -80.67782443 | |
| 17,300.00 | 89.00 | 150.22 | 7,045.87 | -10,780.51 | 4,428.00 | 14,446,402.34 | 1,730,981.95 | 39.77894329 | -80.67764878 | |
| 17,400.00 | 89.00 | 150.22 | 7,047.62 | -10,867.29 | 4,477.67 | 14,446,315.56 | 1,731,031.61 | 39.77870448 | -80.67747313 | |
| 17,500.00 | 89.00 | 150.22 | 7,049.37 | -10,954.07 | 4,527.33 | 14,446,228.78 | 1,731,081.27 | 39.77846568 | -80.67729748 | |
| 17,600.00 | 89.00 | 150.22 | 7,051.12 | -11,040.85 | 4,576.99 | 14,446,142.01 | 1,731,130.93 | 39.77822687 | -80.67712184 | |
| 17,700.00 | 89.00 | 150.22 | 7,052.86 | -11,127.63 | 4,626.65 | 14,446,055.23 | 1,731,180.59 | 39.77798806 | -80.67694619 | |
| 17,800.00 | 89.00 | 150.22 | 7,054.61 | -11,214.40 | 4,676.31 | 14,445,968.45 | 1,731,230.26 | 39.77774925 | -80.67677055 | |
| 17,900.00 | 89.00 | 150.22 | 7,056.36 | -11,301.18 | 4,725.98 | 14,445,881.67 | 1,731,279.92 | 39.77751044 | -80.67659490 | |
| 18,000.00 | 89.00 | 150.22 | 7,058.11 | -11,387.96 | 4,775.64 | 14,445,794.89 | 1,731,329.58 | 39.77727163 | -80.67641926 | |
| 18,100.00 | 89.00 | 150.22 | 7,059.85 | -11,474.74 | 4,825.30 | 14,445,708.11 | 1,731,379.24 | 39.77703282 | -80.67624362 | |
| 18,200.00 | 89.00 | 150.22 | 7,061.60 | -11,561.52 | 4,874.96 | 14,445,621.33 | 1,731,428.90 | 39.77679400 | -80.67606799 | |
| 18,300.00 | 89.00 | 150.22 | 7,063.35 | -11,648.30 | 4,924.62 | 14,445,534.55 | 1,731,478.57 | 39.77655519 | -80.67589235 | |
| 18,400.00 | 89.00 | 150.22 | 7,065.10 | -11,735.08 | 4,974.29 | 14,445,447.77 | 1,731,528.23 | 39.77631638 | -80.67571671 | |
| 18,500.00 | 89.00 | 150.22 | 7,066.84 | -11,821.86 | 5,023.95 | 14,445,360.99 | 1,731,577.89 | 39.77607757 | -80.67554108 | |
| 18,600.00 | 89.00 | 150.22 | 7,068.59 | -11,908.64 | 5,073.61 | 14,445,274.21 | 1,731,627.55 | 39.77583876 | -80.67536544 | |
| 18,700.00 | 89.00 | 150.22 | 7,070.34 | -11,995.42 | 5,123.27 | 14,445,187.43 | 1,731,677.22 | 39.77559995 | -80.67518981 | |
| 18,800.00 | 89.00 | 150.22 | 7,072.08 | -12,082.20 | 5,172.93 | 14,445,100.66 | 1,731,726.88 | 39.77536113 | -80.67501418 | |
| 18,900.00 | 89.00 | 150.22 | 7,073.83 | -12,168.98 | 5,222.60 | 14,445,013.88 | 1,731,776.54 | 39.77512232 | -80.67483855 | |
| 19,000.00 | 89.00 | 150.22 | 7,075.58 | -12,255.75 | 5,272.26 | 14,444,927.10 | 1,731,826.20 | 39.77488351 | -80.67466292 | |
| 19,081.31 | 89.00 | 150.22 | 7,077.00 | -12,326.31 | 5,312.64 | 14,444,856.54 | 1,731,866.58 | 39.77468933 | -80.67452012 | |

PBHL/TD 19081.31 MD/7077.00 TVD

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51-01962
MOD



Planning Report - Geographic

| | | | |
|------------------|--------------------------------|-------------------------------------|-----------------------------|
| Database: | DB_Jul2216dt_v14 | Local Co-ordinate Reference: | Well Heaven Hill 3-2 HM (K) |
| Company: | Tug Hill Operating LLC | TVD Reference: | RKB=1326+26 @ 1352.00usft |
| Project: | Marshall County, West Virginia | MD Reference: | RKB=1326+26 @ 1352.00usft |
| Site: | Heaven Hill 3 | North Reference: | Grid |
| Well: | Heaven Hill 3-2 HM (K) | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Original Hole | | |
| Design: | rev7 | | |

| Design Targets | | | | | | | | | |
|---|-----------|----------|----------|------------|----------|---------------|--------------|-------------|--------------|
| Target Name | Dip Angle | Dip Dir. | TVD | +N/-S | +E/-W | Northing | Easting | Latitude | Longitude |
| - hit/miss target | (°) | (°) | (usft) | (usft) | (usft) | (usft) | (usft) | | |
| - Shape | | | | | | | | | |
| Heaven Hill 3-2 HM LP 5 - plan hits target center - Point | 0.00 | 0.00 | 6,879.00 | -2,493.01 | -314.78 | 14,454,689.84 | 1,726,239.16 | 39.80174853 | -80.69442897 |
| Heaven Hill 3-2 HM BHL - plan hits target center - Point | 0.00 | 0.00 | 7,077.00 | -12,326.32 | 5,312.64 | 14,444,856.53 | 1,731,866.58 | 39.77468932 | -80.67452011 |

| Casing Points | | | | | |
|----------------|----------------|---------------------------|-----------------|---------------|--|
| Measured Depth | Vertical Depth | Name | Casing Diameter | Hole Diameter | |
| (usft) | (usft) | | (") | (") | |
| 146.00 | 146.00 | 30" Casing @ 120 TVD | 30 | 36 | |
| 1,116.00 | 1,116.00 | 13 3/8" Casing @ 1090 TVD | 13-3/8 | 17-1/2 | |
| 2,829.57 | 2,826.00 | 9 5/8" Casing @ 2800 TVD | 9-5/8 | 12-1/4 | |

| Plan Annotations | | | | | |
|------------------|----------------|-------------------|----------|---------------------------------|--|
| Measured Depth | Vertical Depth | Local Coordinates | | Comment | |
| (usft) | (usft) | +N/-S | +E/-W | | |
| | | (usft) | (usft) | | |
| 1,726.00 | 1,726.00 | 0.00 | 0.00 | KOP Begin 2°/100' build | |
| 1,976.00 | 1,975.68 | -10.74 | -1.89 | Begin 5.00° tangent | |
| 3,130.71 | 3,126.00 | -109.85 | -19.37 | Begin 3°/100' build | |
| 4,040.28 | 3,979.76 | -390.67 | -82.88 | Begin 32.28° tangent | |
| 7,089.09 | 6,557.42 | -1,975.86 | -454.43 | Begin 10°/100' build/turn | |
| 7,749.89 | 6,879.00 | -2,493.00 | -314.78 | Begin 89.00° lateral section | |
| 19,081.31 | 7,077.00 | -12,326.31 | 5,312.64 | PBHL/TD 19081.31 MD/7077.00 TVD | |

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APR 3 2018
WV Department of
Environmental Protection

51-01962
MOD

WW-6A1
(5/13)

Operator's Well No. Heaven Hill 3-2HM

**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 *Amy Miller*
 Its: Permitting Specialist - Appalachia Region

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WV Department of
Environmental Protection

05/11/2018

WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 2HM

| Lease Name or No. | Tag | Parcel | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | Deed Book/Page | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|-------------------|-----|----------|--|--------------------------|---------|----------------|------------|------------|------------|------------|------------|-----------------------------|
| 10*15557 | A | 9-7-30 | RICKY L WHITLATCH ET AL | CHEVRON USA INC | 1/8+ | 780 226 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15557 | B | 9-7-21 | RICKY L WHITLATCH ET AL | CHEVRON USA INC | 1/8+ | 780 226 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15667 | C | 9-7-18 | KEVIN E MCGILTON ET UX | CHEVRON USA INC | 1/8+ | 850 351 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15698 | C | 9-7-18 | ROBERT A EDGE AND SHERRIE N EDGE | TH EXPLORATION LLC | 1/8+ | 900 363 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15720 | C | 9-7-18 | KAREN L GREATHOUSE AND FLOYD GREATHOUSE | TH EXPLORATION LLC | 1/8+ | 905 458 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15721 | C | 9-7-18 | TINA L EDGE MONTI AND THOMAS MONTI | TH EXPLORATION LLC | 1/8+ | 905 456 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16020 | C | 9-7-18 | SHARON HINERMAN MAY & DANIEL G MAY | TH EXPLORATION LLC | 1/8+ | 905 464 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16028 | C | 9-7-18 | ROSEMARY PARKINS AND STEPHEN PARKINS | TH EXPLORATION LLC | 1/8+ | 905 460 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16051 | C | 9-7-18 | DONNA JEAN SNIDER AND DAVID SNIDER | TH EXPLORATION LLC | 1/8+ | 905 462 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16053 | C | 9-7-18 | GARY D HINERMAN AND JUDY ANN HINERMAN | TH EXPLORATION LLC | 1/8+ | 905 466 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16289 | C | 9-7-18 | BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON | TH EXPLORATION LLC | 1/8+ | 905 468 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16412 | C | 9-7-18 | ELIZABETH ANN BLAZER AND PAUL R BLAZER | TH EXPLORATION LLC | 1/8+ | 905 452 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16413 | C | 9-7-18 | RONALD H EDGE JR | TH EXPLORATION LLC | 1/8+ | 905 454 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15667 | D | 9-7-20 | KEVIN E MCGILTON ET UX | CHEVRON USA INC | 1/8+ | 850 351 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15698 | D | 9-7-20 | ROBERT A EDGE AND SHERRIE N EDGE | TH EXPLORATION LLC | 1/8+ | 900 363 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15720 | D | 9-7-20 | KAREN L GREATHOUSE AND FLOYD GREATHOUSE | TH EXPLORATION LLC | 1/8+ | 905 458 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15721 | D | 9-7-20 | TINA L EDGE MONTI AND THOMAS MONTI | TH EXPLORATION LLC | 1/8+ | 905 456 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16020 | D | 9-7-20 | SHARON HINERMAN MAY & DANIEL G MAY | TH EXPLORATION LLC | 1/8+ | 905 464 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16028 | D | 9-7-20 | ROSEMARY PARKINS AND STEPHEN PARKINS | TH EXPLORATION LLC | 1/8+ | 905 460 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16051 | D | 9-7-20 | DONNA JEAN SNIDER AND DAVID SNIDER | TH EXPLORATION LLC | 1/8+ | 905 462 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16053 | D | 9-7-20 | GARY D HINERMAN AND JUDY ANN HINERMAN | TH EXPLORATION LLC | 1/8+ | 905 466 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16289 | D | 9-7-20 | BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON | TH EXPLORATION LLC | 1/8+ | 905 468 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16412 | D | 9-7-20 | ELIZABETH ANN BLAZER AND PAUL R BLAZER | TH EXPLORATION LLC | 1/8+ | 905 452 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16413 | D | 9-7-20 | RONALD H EDGE JR | TH EXPLORATION LLC | 1/8+ | 905 454 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15667 | E | 9-7-19 | KEVIN E MCGILTON ET UX | CHEVRON USA INC | 1/8+ | 850 351 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15669 | F | 9-11-6.1 | EMMA ANDERSON | CHEVRON USA INC | 1/8+ | 861 586 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15670 | F | 9-11-6.1 | GARY M BONAR AND ELLEN L BONAR | CHEVRON USA INC | 1/8+ | 861 577 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15671 | F | 9-11-6.1 | JUDALENE K COLLUMS | CHEVRON USA INC | 1/8+ | 861 571 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15672 | F | 9-11-6.1 | NAOMI HUPP | CHEVRON USA INC | 1/8+ | 861 604 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*47051.256.1 | F | 9-11-6.1 | BRENDA J WHETZEL | TH EXPLORATION LLC | 1/8+ | 881 145 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.2 | F | 9-11-6.1 | CAROL JEAN ANDERSON | TH EXPLORATION LLC | 1/8+ | 879 299 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.3 | F | 9-11-6.1 | BRENDA S DYKHOUSE | TH EXPLORATION LLC | 1/8+ | 881 148 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.4 | F | 9-11-6.1 | GLEN A BONAR | TH EXPLORATION LLC | 1/8+ | 881 151 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.5 | F | 9-11-6.1 | JERRY W ZIEN AND KATHLEEN E ZIEN | TH EXPLORATION LLC | 1/8+ | 882 530 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15669 | G | 9-11-6 | EMMA ANDERSON | CHEVRON USA INC | 1/8+ | 861 586 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15670 | G | 9-11-6 | GARY M BONAR AND ELLEN L BONAR | CHEVRON USA INC | 1/8+ | 861 577 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15671 | G | 9-11-6 | JUDALENE K COLLUMS | CHEVRON USA INC | 1/8+ | 861 571 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15672 | G | 9-11-6 | NAOMI HUPP | CHEVRON USA INC | 1/8+ | 861 604 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*47051.256.1 | G | 9-11-6 | BRENDA J WHETZEL | TH EXPLORATION LLC | 1/8+ | 881 145 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.2 | G | 9-11-6 | CAROL JEAN ANDERSON | TH EXPLORATION LLC | 1/8+ | 879 299 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.3 | G | 9-11-6 | BRENDA S DYKHOUSE | TH EXPLORATION LLC | 1/8+ | 881 148 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.4 | G | 9-11-6 | GLEN A BONAR | TH EXPLORATION LLC | 1/8+ | 881 151 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.256.5 | G | 9-11-6 | JERRY W ZIEN AND KATHLEEN E ZIEN | TH EXPLORATION LLC | 1/8+ | 882 530 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.108.1 | H | 9-11-9 | MICHAEL A WHETZEL | TH EXPLORATION LLC | 1/8+ | 885 51 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15582 | I | 9-11-10 | ROBERT L CLARK | CHESAPEAKE APPALACHIA LL | 1/8+ | 685 239 | N/A | N/A | N/A | N/A | 30/461 | Chevron to Tug Hill: 36/148 |
| 10*15559 | J | 9-11-11 | KENNETH M MCCARDLE ET UX REV LT | CHEVRON USA INC | 1/8+ | 816 499 | N/A | N/A | N/A | N/A | N/A | Chevron to Tug Hill: 36/148 |
| 10*15477 | K | 9-14-18 | RONALD A WYCINSKI | TH EXPLORATION LLC | 1/8+ | 906 241 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15730 | K | 9-14-18 | FRANCES V CARPENTER | TH EXPLORATION LLC | 1/8+ | 906 256 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15752 | K | 9-14-18 | KIM O CHAMBERS AND DEBRA CHAMBERS | TH EXPLORATION LLC | 1/8+ | 906 258 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16017 | K | 9-14-18 | FLOYD A MCFADDEN | TH EXPLORATION LLC | 1/8+ | 906 260 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16018 | K | 9-14-18 | BARBARA MCFADDEN ALBRIGHT | TH EXPLORATION LLC | 1/8+ | 906 262 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16030 | K | 9-14-18 | JOSEPH F CHMIELEWSKI AND SANDRA CHMIELEWSKI | TH EXPLORATION LLC | 1/8+ | 906 264 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16031 | K | 9-14-18 | CARL J CHMIELEWSKI AND KATHLEEN A CHMIELEWSKI | TH EXPLORATION LLC | 1/8+ | 906 266 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16083 | K | 9-14-18 | CECIL HARRY LILLY, III AND PAMELA KAY KNIGHT LILLY | TH EXPLORATION LLC | 1/8+ | 912 47 | N/A | N/A | N/A | N/A | N/A | N/A |

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WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 2HM

| Lease Name or No. | Tag | Parcel | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | Deed Book/Page | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|-------------------|-----|---------|--|-----------------------|---------|----------------|------------|------------|------------|------------|------------|------------|
| 10*16085 | K | 9-14-18 | KATHARYN ANNETTE LILLY LAING AND FREDDIE JOE LAING | TH EXPLORATION LLC | 1/8+ | 912 43 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16086 | K | 9-14-18 | KATHARYN DAY LILLY | TH EXPLORATION LLC | 1/8+ | 906 272 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16087 | K | 9-14-18 | MARY PENELOPE LILLY MURPHY | TH EXPLORATION LLC | 1/8+ | 912 41 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16131 | K | 9-14-18 | ERIC S DOBBS | TH EXPLORATION LLC | 1/8+ | 902 68 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16144 | K | 9-14-18 | PATTIE S MADRID | TH EXPLORATION LLC | 1/8+ | 906 278 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16180 | K | 9-14-18 | LARRY L CHAMBERS | TH EXPLORATION LLC | 1/8+ | 906 280 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16181 | K | 9-14-18 | NORMA CHRISTINE WHIPP AND GERALD WAYNE BLACK | TH EXPLORATION LLC | 1/8+ | 906 281 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | | FIRST CHRISTIAN CHURCH OF MOUNDSVILLE BY ROGER FRANCIS AND | | | | | | | | | |
| 10*16182 | K | 9-14-18 | ROBERT ALBERT TRUSTEES | TH EXPLORATION LLC | 1/8+ | 906 283 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16183 | K | 9-14-18 | ALLEN R L DAVIS AND DIANA LEE PATTERSON | TH EXPLORATION LLC | 1/8+ | 906 285 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16239 | K | 9-14-18 | ANGELA L OLDFIELD AND KENNETH W OLDFIELD | TH EXPLORATION LLC | 1/8+ | 906 287 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16240 | K | 9-14-18 | BONNIE SUE PATTERSON SWISHER | TH EXPLORATION LLC | 1/8+ | 906 289 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16285 | K | 9-14-18 | JOHN A SHUTZ AND CYNTHIA J SHUTZ | TH EXPLORATION LLC | 1/8+ | 906 291 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16441 | K | 9-14-18 | GEORGE FRANKLIN AND NANCY ANN REED | TH EXPLORATION LLC | 1/8+ | 924 619 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16442 | K | 9-14-18 | FRED T AND JERRY L CHAMBERS | TH EXPLORATION LLC | 1/8+ | 924 174 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16443 | K | 9-14-18 | BARBARA BROWN CHAMBERS | TH EXPLORATION LLC | 1/8+ | 924 621 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16444 | K | 9-14-18 | CATHERINE ELLEN CHAMBERS | TH EXPLORATION LLC | 1/8+ | 924 623 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16445 | K | 9-14-18 | DOUGLAS C AND GWENDLYN D LEWTON | TH EXPLORATION LLC | 1/8+ | 925 123 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16483 | K | 9-14-18 | JOHN C AND BARBARA H WINTER | TH EXPLORATION LLC | 1/8+ | 924 178 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16486 | K | 9-14-18 | DAVID ALAN WILKINSON AND PATRICIA LYNN WILKINSON | TH EXPLORATION LLC | 1/8+ | 924 180 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16490 | K | 9-14-18 | WILLIAM H AND MERRY C COTTON | TH EXPLORATION LLC | 1/8+ | 924 176 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16511 | K | 9-14-18 | DOUGLAS R BOWEN | TH EXPLORATION LLC | 1/8+ | 906 475 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16531 | K | 9-14-18 | KATHY DOBBS WELLS | TH EXPLORATION LLC | 1/8+ | 906 472 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16532 | K | 9-14-18 | JEAN ANN MCFADDEN | TH EXPLORATION LLC | 1/8+ | 906 459 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16533 | K | 9-14-18 | SHIRLEY ANN DOBBS | TH EXPLORATION LLC | 1/8+ | 906 469 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16534 | K | 9-14-18 | TERRY LEE LASAVAGE | TH EXPLORATION LLC | 1/8+ | 906 443 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16535 | K | 9-14-18 | CHARLES E CARSON AND MARY KAY CARSON | TH EXPLORATION LLC | 1/8+ | 906 420 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16537 | K | 9-14-18 | KIM D BOWEN AND MADONNA M BOWEN | TH EXPLORATION LLC | 1/8+ | 907 415 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16540 | K | 9-14-18 | JAMES A WINTER AND CONNIE G WINTER | TH EXPLORATION LLC | 1/8+ | 924 184 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16569 | K | 9-14-18 | JANICE C BALE | TH EXPLORATION LLC | 1/8+ | 907 425 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16570 | K | 9-14-18 | ROBERT D BOWEN AND MARCIA M R BOWEN | TH EXPLORATION LLC | 1/8+ | 907 420 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16576 | K | 9-14-18 | LINDA A MINER AND MICHAEL W MINER | TH EXPLORATION LLC | 1/8+ | 907 484 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16580 | K | 9-14-18 | HAROLD C MCFADDEN | TH EXPLORATION LLC | 1/8+ | 907 480 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16581 | K | 9-14-18 | HELEN L SCHILLING | TH EXPLORATION LLC | 1/8+ | 907 489 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16582 | K | 9-14-18 | DORA BROCK BRAMMER | TH EXPLORATION LLC | 1/8+ | 907 429 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16680 | K | 9-14-18 | RONALD J AND JENNIFER CHAMBERS FICCA | TH EXPLORATION LLC | 1/8+ | 924 186 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16726 | K | 9-14-18 | LESLY K WHITE | TH EXPLORATION LLC | 1/8+ | 924 182 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16733 | K | 9-14-18 | SARAH L BISHOP | TH EXPLORATION LLC | 1/8+ | 924 172 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16835 | K | 9-14-18 | ERNEST CARL AUGUSTINE JR | TH EXPLORATION LLC | 1/8+ | 924 188 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16882 | K | 9-14-18 | JAMES LEROY AND DARLENE DOBBS OWENS | TH EXPLORATION LLC | 1/8+ | 924 190 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16948 | K | 9-14-18 | FREDERICK M LEWTON | TH EXPLORATION LLC | 1/8+ | 924 136 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16949 | K | 9-14-18 | STEVEN R AND BRIANNE L UTT | TH EXPLORATION LLC | 1/8+ | 924 138 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16950 | K | 9-14-18 | JAY E AND CECILIA E LEWTON | TH EXPLORATION LLC | 1/8+ | 924 134 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16952 | K | 9-14-18 | RUSSELL D HERVEY | TH EXPLORATION LLC | 1/8+ | 924 132 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16953 | K | 9-14-18 | DONALD T AND JEAN K HOGAN | TH EXPLORATION LLC | 1/8+ | 924 140 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16965 | K | 9-14-18 | WILLIAM L WRIGHT AND CAROLINA WRIGHT | TH EXPLORATION LLC | 1/8+ | 914 524 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16966 | K | 9-14-18 | JOHN GILLETTE AND BARBARA GILLETTE | TH EXPLORATION LLC | 1/8+ | 913 377 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16967 | K | 9-14-18 | TARA JEANNE MINOR AND JENNIFER A KNAPP | TH EXPLORATION LLC | 1/8+ | 914 612 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16990 | K | 9-14-18 | ROSEMARY H BEAVERS | TH EXPLORATION LLC | 1/8+ | 924 152 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16992 | K | 9-14-18 | LINDA C ABRAHAM | TH EXPLORATION LLC | 1/8+ | 924 148 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16993 | K | 9-14-18 | JULIA HOOVER | TH EXPLORATION LLC | 1/8+ | 924 150 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16995 | K | 9-14-18 | DIANE ELSIE RAMSEY | TH EXPLORATION LLC | 1/8+ | 924 146 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17129 | K | 9-14-18 | ROBERTA JANE PARKINSON | TH EXPLORATION LLC | 1/8+ | 924 142 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17131 | K | 9-14-18 | LAURA E TOTTEN AND LONNIE R TOTTEN | TH EXPLORATION LLC | 1/8+ | 924 154 | N/A | N/A | N/A | N/A | N/A | N/A |

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| Lease Name or No. | Tag | Parcel | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | Deed Book/Page | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|-------------------|-----|---------|--|-----------------------|---------|----------------|------------|------------|------------|------------|------------|------------|
| 10*17881 | K | 9-14-18 | WAYLON L & ANGELA J MURPHEE | TH EXPLORATION, LLC | 1/8+ | 924 555 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17885 | K | 9-14-18 | JOHN RUSSELL BECKER | TH EXPLORATION, LLC | 1/8+ | 924 540 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.1 | K | 9-14-18 | JUDITH A LEWANDOSKY AND ALAN E LEWANDOSKY | TH EXPLORATION LLC | 1/8+ | 906 225 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.2 | K | 9-14-18 | TIMMY LEE STOUT AND DOROTHY MARIE STOUT | TH EXPLORATION LLC | 1/8+ | 906 222 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.3 | K | 9-14-18 | NICHOLAS D PAVLIK AND GLORIA K PAVLIK | TH EXPLORATION LLC | 1/8+ | 906 228 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.4 | K | 9-14-18 | JAMES H WHITE AND RITA FRANKS WHITE | TH EXPLORATION LLC | 1/8+ | 906 230 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.5 | K | 9-14-18 | SAMUEL ALAN MCCORD AND WINIFRED A MCKEE | TH EXPLORATION LLC | 1/8+ | 906 232 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.6 | K | 9-14-18 | THOMAS O MCCORD | TH EXPLORATION LLC | 1/8+ | 906 235 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.7 | K | 9-14-18 | SHERON JONES | TH EXPLORATION LLC | 1/8+ | 906 237 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.8 | K | 9-14-18 | RICK PAVLIK | TH EXPLORATION LLC | 1/8+ | 906 239 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15752 | L | 9-15-3 | KIM O CHAMBERS AND DEBRA CHAMBERS | TH EXPLORATION LLC | 1/8+ | 906 258 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16017 | L | 9-15-3 | FLOYD A MCFADDEN | TH EXPLORATION LLC | 1/8+ | 906 260 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16018 | L | 9-15-3 | BARBARA MCFADDEN ALBRIGHT | TH EXPLORATION LLC | 1/8+ | 906 262 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16144 | L | 9-15-3 | PATTIE S MADRID | TH EXPLORATION LLC | 1/8+ | 906 278 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16180 | L | 9-15-3 | LARRY L CHAMBERS | TH EXPLORATION LLC | 1/8+ | 906 280 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16181 | L | 9-15-3 | NORMA CHRISTINE WHIPP AND GERALD WAYNE BLACK | TH EXPLORATION LLC | 1/8+ | 906 281 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | | FIRST CHRISTIAN CHURCH OF MOUNDSVILLE BY ROGER FRANCIS AND | | | | | | | | | |
| 10*16182 | L | 9-15-3 | ROBERT ALBERT TRUSTEES | TH EXPLORATION LLC | 1/8+ | 906 283 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16239 | L | 9-15-3 | ANGELA L OLDFIELD AND KENNETH W OLDFIELD | TH EXPLORATION LLC | 1/8+ | 906 287 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16285 | L | 9-15-3 | JOHN A SHUTZ AND CYNTHIA J SHUTZ | TH EXPLORATION LLC | 1/8+ | 906 291 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16441 | L | 9-15-3 | GEORGE FRANKLIN AND NANCY ANN REED | TH EXPLORATION LLC | 1/8+ | 924 619 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16442 | L | 9-15-3 | FRED T AND JERRY L CHAMBERS | TH EXPLORATION LLC | 1/8+ | 924 174 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16443 | L | 9-15-3 | BARBARA BROWN CHAMBERS | TH EXPLORATION LLC | 1/8+ | 924 621 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16444 | L | 9-15-3 | CATHERINE ELLEN CHAMBERS | TH EXPLORATION LLC | 1/8+ | 924 623 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16445 | L | 9-15-3 | DOUGLAS C AND GWENDLYN D LEWTON | TH EXPLORATION LLC | 1/8+ | 925 123 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16483 | L | 9-15-3 | JOHN C AND BARBARA H WINTER | TH EXPLORATION LLC | 1/8+ | 924 178 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16486 | L | 9-15-3 | DAVID ALAN WILKINSON AND PATRICIA LYNN WILKINSON | TH EXPLORATION LLC | 1/8+ | 924 180 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16490 | L | 9-15-3 | WILLIAM H AND MERRY C COTTON | TH EXPLORATION LLC | 1/8+ | 924 176 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16498 | L | 9-15-3 | SHELLY YEATER | TH EXPLORATION LLC | 1/8+ | 925 283 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16511 | L | 9-15-3 | DOUGLAS R BOWEN | TH EXPLORATION LLC | 1/8+ | 906 475 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16532 | L | 9-15-3 | JEAN ANN MCFADDEN | TH EXPLORATION LLC | 1/8+ | 906 459 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16534 | L | 9-15-3 | TERRY LEE LASAVAGE | TH EXPLORATION LLC | 1/8+ | 906 443 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16535 | L | 9-15-3 | CHARLES E CARSON AND MARY KAY CARSON | TH EXPLORATION LLC | 1/8+ | 906 420 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16537 | L | 9-15-3 | KIM D BOWEN AND MADONNA M BOWEN | TH EXPLORATION LLC | 1/8+ | 907 415 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16540 | L | 9-15-3 | JAMES A WINTER AND CONNIE G WINTER | TH EXPLORATION LLC | 1/8+ | 924 184 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16569 | L | 9-15-3 | JANICE C BALE | TH EXPLORATION LLC | 1/8+ | 907 425 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16570 | L | 9-15-3 | ROBERT D BOWEN AND MARCIA M R BOWEN | TH EXPLORATION LLC | 1/8+ | 907 420 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16576 | L | 9-15-3 | LINDA A MINER AND MICHAEL W MINER | TH EXPLORATION LLC | 1/8+ | 907 484 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16580 | L | 9-15-3 | HAROLD C MCFADDEN | TH EXPLORATION LLC | 1/8+ | 907 480 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16581 | L | 9-15-3 | HELEN L SCHILLING | TH EXPLORATION LLC | 1/8+ | 907 489 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16582 | L | 9-15-3 | DORA BROCK BRAMMER | TH EXPLORATION LLC | 1/8+ | 907 429 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16680 | L | 9-15-3 | RONALD J AND JENNIFER CHAMBERS FICCA | TH EXPLORATION LLC | 1/8+ | 924 186 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16726 | L | 9-15-3 | LESLEY K WHITE | TH EXPLORATION LLC | 1/8+ | 924 182 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16733 | L | 9-15-3 | SARAH L BISHOP | TH EXPLORATION LLC | 1/8+ | 924 172 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16835 | L | 9-15-3 | ERNEST CARL AUGUSTINE JR | TH EXPLORATION LLC | 1/8+ | 924 188 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16948 | L | 9-15-3 | FREDERICK M LEWTON | TH EXPLORATION LLC | 1/8+ | 924 136 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16949 | L | 9-15-3 | STEVEN R AND BRIANNE L UTT | TH EXPLORATION LLC | 1/8+ | 924 138 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16950 | L | 9-15-3 | JAY E AND CECILIA E LEWTON | TH EXPLORATION LLC | 1/8+ | 924 134 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16952 | L | 9-15-3 | RUSSELL D HERVEY | TH EXPLORATION LLC | 1/8+ | 924 132 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16953 | L | 9-15-3 | DONALD T AND JEAN K HOGAN | TH EXPLORATION LLC | 1/8+ | 924 140 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16990 | L | 9-15-3 | ROSEMARY H BEAVERS | TH EXPLORATION LLC | 1/8+ | 924 152 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16992 | L | 9-15-3 | LINDA C ABRAHAM | TH EXPLORATION LLC | 1/8+ | 924 148 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16993 | L | 9-15-3 | JULIA HOOVER | TH EXPLORATION LLC | 1/8+ | 924 150 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16995 | L | 9-15-3 | DIANE ELSIE RAMSEY | TH EXPLORATION LLC | 1/8+ | 924 146 | N/A | N/A | N/A | N/A | N/A | N/A |

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APR 3 2018

WV Department of
Environmental Protection

| Lease Name or No. | Tag | Parcel | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | Deed Book/Page | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|-------------------|-----|---------|--|---------------------------|---------|----------------|-------------------------------|--------------------------------|---------------------------------|--|-----------------------------|------------------------------|
| 10*17129 | L | 9-15-3 | ROBERTA JANE PARKINSON | TH EXPLORATION LLC | 1/8+ | 924 142 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17131 | L | 9-15-3 | LAURA E TOTTEN AND LONNIE R TOTTEN | TH EXPLORATION LLC | 1/8+ | 924 154 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17134 | L | 9-15-3 | UNITED CHRISTIAN MISSIONARY SOCIETY | TH EXPLORATION LLC | 1/8+ | 924 144 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17209 | L | 9-15-3 | GAYLE S SHANNON | TH EXPLORATION LLC | 1/8+ | 924 168 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17289 | L | 9-15-3 | HAROLD R HUNT JR AND ELIZABETH A HUNT | TH EXPLORATION LLC | 1/8+ | 924 170 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17396 | L | 9-15-3 | CHRISTINE L KIDD | TH EXPLORATION LLC | 1/8+ | 924 158 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17413 | L | 9-15-3 | ROBERT M CHAMBERS AND CHARLOTTE A CHAMBERS | TH EXPLORATION LLC | 1/8+ | 924 160 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17436 | L | 9-15-3 | ANDREW M HOOVER AND DINAH R HOOVER | TH EXPLORATION LLC | 1/8+ | 924 156 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17448 | L | 9-15-3 | FREDERICK L HERVEY AND CATHY J HERVEY | TH EXPLORATION LLC | 1/8+ | 924 162 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17452 | L | 9-15-3 | ALAN H & MARY K DEGARMO | TH EXPLORATION, LLC | 1/8+ | 924 164 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17486 | L | 9-15-3 | JOSELYN M KEELY | TH EXPLORATION LLC | 1/8+ | 929 364 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17487 | L | 9-15-3 | DEBORAH R MOKOSH | TH EXPLORATION LLC | 1/8+ | 924 166 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17563 | L | 9-15-3 | DONALD L WOOD | TH EXPLORATION LLC | 1/8+ | 923 523 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17617 | L | 9-15-3 | UNITED DISCIPLES OF CHRIST CHURCH | TH EXPLORATION LLC | 1/8+ | 924 129 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17674 | L | 9-15-3 | HOWARD L & BETH E WOOD | TH EXPLORATION, LLC | 1/8+ | 923 505 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17675 | L | 9-15-3 | GREGORY D & CAROLYN J WIBLE | TH EXPLORATION, LLC | 1/8+ | 923 507 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17701 | L | 9-15-3 | SUE ANN WORD | TH EXPLORATION, LLC | 1/8+ | 923 470 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17702 | L | 9-15-3 | TAMMY BETH RAMSEY | TH EXPLORATION, LLC | 1/8+ | 925 500 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.1 | L | 9-15-3 | JUDITH A LEWANDOSKY AND ALAN E LEWANDOSKY | TH EXPLORATION LLC | 1/8+ | 906 705 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.3 | L | 9-15-3 | NICHOLAS D PAVLIK AND GLORIA K PAVLIK | TH EXPLORATION LLC | 1/8+ | 906 228 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.4 | L | 9-15-3 | JAMES H WHITE AND RITA FRANKS WHITE | TH EXPLORATION LLC | 1/8+ | 906 230 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.5 | L | 9-15-3 | SAMUEL ALAN MCCORD AND WINIFRED A MCKEE | TH EXPLORATION LLC | 1/8+ | 906 232 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.6 | L | 9-15-3 | THOMAS O MCCORD | TH EXPLORATION LLC | 1/8+ | 906 235 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.7 | L | 9-15-3 | SHERON JONES | TH EXPLORATION LLC | 1/8+ | 906 237 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*47051.325.8 | L | 9-15-3 | RICK PAVLIK | TH EXPLORATION LLC | 1/8+ | 906 239 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17164 | M | 9-15-1 | BETTY D VEST | TH EXPLORATION LLC | 1/8+ | 925 141 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17163 | M | 9-15-1 | HOLLY JILL COHAGAN | TH EXPLORATION LLC | 1/8+ | 925 130 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17293 | M | 9-15-1 | JANICE L PIETERSE | TH EXPLORATION LLC | 1/8+ | 925 149 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16480 | M | 9-15-1 | JOHN D HAYES AND LYNDA SIGMON HAYES | TH EXPLORATION LLC | 1/8+ | 925 164 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16518 | M | 9-15-1 | JOHN P AND ROSE HOWELL RICKEY | TH EXPLORATION LLC | 1/8+ | 925 146 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17165 | M | 9-15-1 | LAURA A PETTIGREW | TH EXPLORATION LLC | 1/8+ | 925 151 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16739 | M | 9-15-1 | MARK M BASSETT | TH EXPLORATION LLC | 1/8+ | 911 78 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16519 | M | 9-15-1 | NORMAN B AND JO ELLEN KAUBLE | TH EXPLORATION LLC | 1/8+ | 925 156 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17132 | M | 9-15-1 | OTTO J N AND LAUREL ANN KUNST | TH EXPLORATION LLC | 1/8+ | 925 153 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16246 | M | 9-15-1 | R RICK HYRE | TH EXPLORATION LLC | 1/8+ | 925 162 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17168 | M | 9-15-1 | RANDY K AND ALICE E BOWER | TH EXPLORATION LLC | 1/8+ | 925 135 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16848 | M | 9-15-1 | RICHARD W DOUTHITT | TH EXPLORATION LLC | 1/8+ | 925 128 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16482 | M | 9-15-1 | SAMUEL J RICKEY | TH EXPLORATION LLC | 1/8+ | 925 143 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17768 | M | 9-15-1 | SHERI L EVRAETS | TH EXPLORATION, LLC | 1/8+ | 925 125 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17332 | M | 9-15-1 | TODD W BULLARD AND BETH H BULLARD | TH EXPLORATION LLC | 1/8+ | 925 132 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*17621 | M | 9-15-1 | WILLIAM M BECKER AND KATHARINE B BECKER | TH EXPLORATION LLC | 1/8+ | 925 138 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*16897 | M | 9-15-1 | WILLIAM W AND NOREEN M HYRE | TH EXPLORATION LLC | 1/8+ | 925 159 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15520 | N | 9-14-19 | ELIZABETH ANN STRAUSBAUGH | CHESAPEAKE APPALACHIA LLC | 1/8+ | 703 578 | Chesapeake to Statoil: 29/325 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15815 | N | 9-14-19 | FORREST M THOMAS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 694 516 | Chesapeake to Statoil: 23/479 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*17445 | N | 9-14-19 | GENEVA BASSETT SANCHEZ | TH EXPLORATION LLC | 1/8+ | 929 292 | N/A | N/A | N/A | N/A | N/A | N/A |

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Office of Oil and Gas
APR 3 2018
MAR Management

51-01962-150

51-01962 MON

WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 2HM

| Lease Name or No. | Tag | Parcel | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | Deed Book/Page | Assignment | Assignment | Assignment | Assignment | Assignment | Assignment |
|-------------------|-----|---------|--------------------------------------|---------------------------|---------|----------------|-------------------------------|--------------------------------|---------------------------------|--|-----------------------------|------------------------------|
| 10*15819 | N | 9-14-19 | JANET LEA BLANKENSHIP | CHESAPEAKE APPALACHIA LLC | 1/8+ | 708 114 | Chesapeake to Statoil: 29/325 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15814 | N | 9-14-19 | MARY E BASSETT | CHESAPEAKE APPALACHIA LLC | 1/8+ | 694 499 | Chesapeake to Statoil: 24/84 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15813 | N | 9-14-19 | ROBERT B THOMAS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 692 235 | Chesapeake to Statoil: 32/247 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15817 | N | 9-14-19 | RUTH MEADOWS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 703 583 | Chesapeake to Statoil: 29/325 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15816 | N | 9-14-19 | SALLY CYNTHIA HOPKINS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 697 116 | Chesapeake to Statoil: 23/512 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15818 | O | 9-15-16 | ELIZABETH ANN STRAUSBAUGH | CHESAPEAKE APPALACHIA LLC | 1/8+ | 703 578 | Chesapeake to Statoil: 29/325 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15815 | O | 9-15-16 | FORREST M THOMAS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 694 516 | Chesapeake to Statoil: 23/479 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*17445 | O | 9-15-16 | GENEVA BASSETT SANCHEZ | TH EXPLORATION LLC | 1/8+ | 929 292 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10*15819 | O | 9-15-16 | JANET LEA BLANKENSHIP | CHESAPEAKE APPALACHIA LLC | 1/8+ | 708 114 | Chesapeake to Statoil: 29/325 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15814 | O | 9-15-16 | MARY E BASSETT | CHESAPEAKE APPALACHIA LLC | 1/8+ | 694 499 | Chesapeake to Statoil: 24/84 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15813 | O | 9-15-16 | ROBERT B THOMAS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 692 235 | Chesapeake to Statoil: 32/247 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15817 | O | 9-15-16 | RUTH MEADOWS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 703 583 | Chesapeake to Statoil: 29/325 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*15816 | O | 9-15-16 | SALLY CYNTHIA HOPKINS | CHESAPEAKE APPALACHIA LLC | 1/8+ | 697 116 | Chesapeake to Statoil: 23/512 | Chesapeake to SWN Prod: 33/110 | Statoil to SWN Exchange: 33/424 | Merger - SWN Exchange TitleHolder LLC & SWN Production Company LLC: 19/624 | Statoil to Tug Hill: 36/455 | SWN Prod to Tug Hill: 36/431 |
| 10*19533 | P | 9-15-15 | LEONARD F DAVIS SR AND LINDA K DAVIS | TH EXPLORATION LLC | 1/8+ | 937 308 | N/A | N/A | N/A | N/A | N/A | N/A |

APR 3 2018
 Environmental Protection
 Department of



*John
York*

Well Site Safety Plan

Tug Hill Operating, LLC

Well Name: Heaven Hill 3-2HM

Pad Location: Heaven Hill 3

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:
Northing-4,406,558.15
Easting -526,254.70

March 2018

05/11/2018

7,476' T.H.

2,207 B.H.

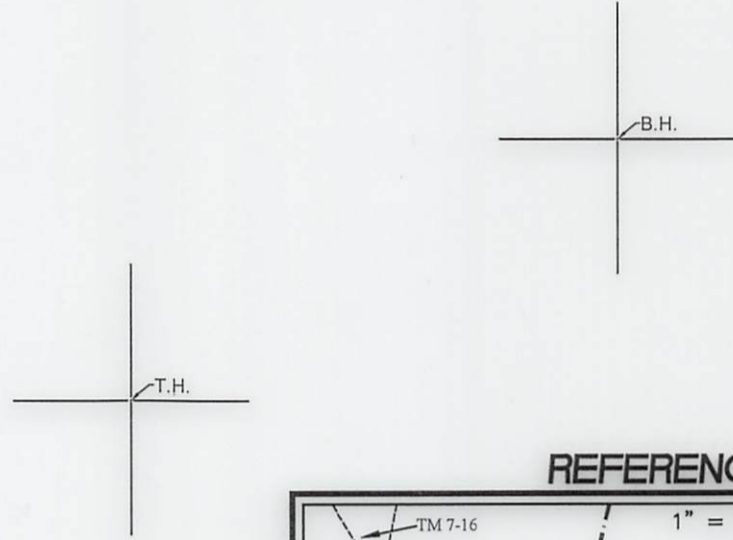
**HEAVEN HILL 3 LEASE
WELL 2HM
TUG HILL OPERATING**

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

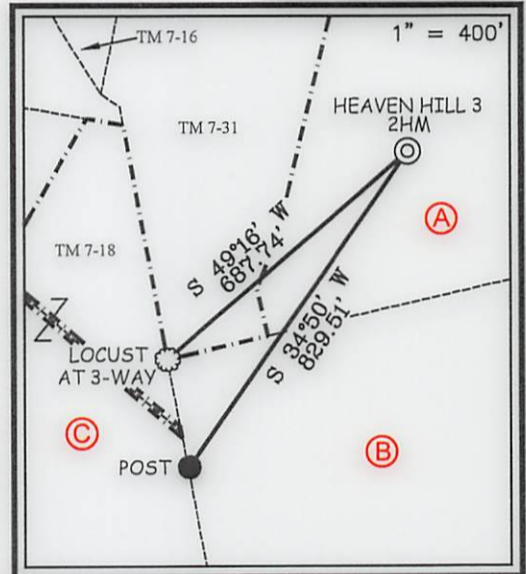
| (S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH) | | |
|--|-------------------|--------------------|
| NAD'83 S.P.C.(FT) | N. 478,856.74 | E. 1,633,284.15 |
| NAD'83 GEO. | LAT-(N) 39.808592 | LONG-(W) 80.693278 |
| NAD'83 UTM (M) | N. 4,406,558.15 | E. 526,254.70 |
| LANDING POINT | | |
| NAD'83 S.P.C.(FT) | N. 476,368.5 | E. 1,632,927.6 |
| NAD'83 GEO. | LAT-(N) 39.801749 | LONG-(W) 80.694429 |
| NAD'83 UTM (M) | N. 4,405,798.3 | E. 526,158.8 |
| BOTTOM HOLE | | |
| NAD'83 S.P.C.(FT) | N. 466,439.2 | E. 1,638,391.8 |
| NAD'83 GEO. | LAT-(N) 39.774689 | LONG-(W) 80.674520 |
| NAD'83 UTM (M) | N. 4,402,801.1 | E. 527,874.0 |

T.H. LONGITUDE 80°40'00"
B.H. LONGITUDE 80°40'00"

6,184' B.H.
9,013' T.H.



REFERENCES



NOTES ON SURVEY

1. 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.
2. WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'



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

P.S. 677

Gregory A. Smith



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

DATE JUNE 30, 20 17

REVISED FEBRUARY 2, 2018 & MARCH 22, 2018

OPERATORS WELL NO. HEAVEN HILL 3-2HM

API WELL NO. 47-051-01962 MOD H6A
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8654P2HMR2.dwg
SCALE 1" = 2000'

HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

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



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

LOCATION: ELEVATION GROUND = 1,341.3' PROPOSED = 1,326.35' WATERSHED LOWER BOWMAN RUN OF FISH CREEK (HUC 10)

DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER RICKY L. WHITLATCH ACREAGE 72.82±

ROYALTY OWNER RICKY L. WHITLATCH, ET AL - SEE WW-6A1 ACREAGE 72.82±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

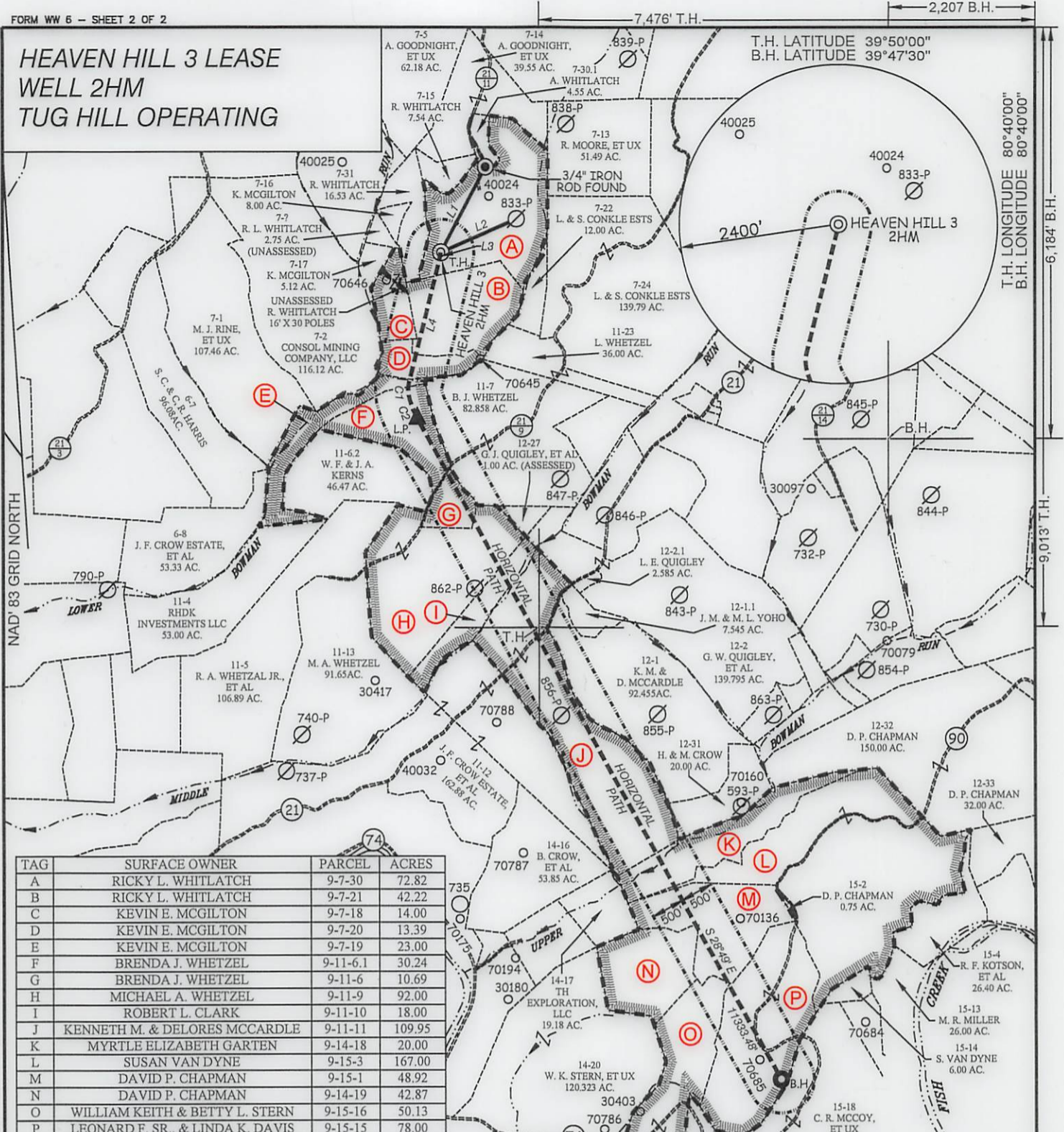
PHYSICAL CHANGE IN WELL (SPECIFY) _____ TARGET FORMATION MARCELLUS

ESTIMATED DEPTH TVD: 6,876' / TMD: 19,081'

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

**HEAVEN HILL 3 LEASE
WELL 2HM
TUG HILL OPERATING**



| TAG | SURFACE OWNER | PARCEL | ACRES |
|-----|----------------------------------|----------|--------|
| A | RICKY L. WHITLATCH | 9-7-30 | 72.82 |
| B | RICKY L. WHITLATCH | 9-7-21 | 42.22 |
| C | KEVIN E. MCGILTON | 9-7-18 | 14.00 |
| D | KEVIN E. MCGILTON | 9-7-20 | 13.39 |
| E | KEVIN E. MCGILTON | 9-7-19 | 23.00 |
| F | BRENDA J. WHETZEL | 9-11-6.1 | 30.24 |
| G | BRENDA J. WHETZEL | 9-11-6 | 10.69 |
| H | MICHAEL A. WHETZEL | 9-11-9 | 92.00 |
| I | ROBERT L. CLARK | 9-11-10 | 18.00 |
| J | KENNETH M. & DELORES MCCARDLE | 9-11-11 | 109.95 |
| K | MYRTLE ELIZABETH GARTEN | 9-14-18 | 20.00 |
| L | SUSAN VAN DYNE | 9-15-3 | 167.00 |
| M | DAVID P. CHAPMAN | 9-15-1 | 48.92 |
| N | DAVID P. CHAPMAN | 9-14-19 | 42.87 |
| O | WILLIAM KEITH & BETTY L. STERN | 9-15-16 | 50.13 |
| P | LEONARD F. SR., & LINDA K. DAVIS | 9-15-15 | 78.00 |

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 | 12 Vanhorn Drive | Glenville, WV 26031 | (304) 462-5634
www.slsurveys.com

P.S. 677
Gregory A. Smith

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

| | | |
|-------------------|-------------------|--------------------|
| NAD'83 S.P.C.(FT) | N. 478,856.74 | E. 1,633,284.15 |
| NAD'83 GEO. | LAT-(N) 39.808592 | LONG-(W) 80.693278 |
| NAD'83 UTM (M) | N. 4,406,558.15 | E. 526,254.70 |

LANDING POINT

| | | |
|-------------------|-------------------|--------------------|
| NAD'83 S.P.C.(FT) | N. 478,368.5 | E. 1,632,927.6 |
| NAD'83 GEO. | LAT-(N) 39.801749 | LONG-(W) 80.694429 |
| NAD'83 UTM (M) | N. 4,405,798.3 | E. 526,158.8 |

BOTTOM HOLE

| | | |
|-------------------|-------------------|--------------------|
| NAD'83 S.P.C.(FT) | N. 486,439.2 | E. 1,638,391.8 |
| NAD'83 GEO. | LAT-(N) 39.774689 | LONG-(W) 80.674520 |
| NAD'83 UTM (M) | N. 4,402,801.1 | E. 527,874.0 |

GREGORY A. SMITH
LICENSED
No. 677
STATE OF
WEST VIRGINIA
PROFESSIONAL SURVEYOR

SCALE 1" = 2000' FILE NO. 8654P2HMR2.dwg
DATE JUNE 30, 20 17
REVISED FEBRUARY 2, 2018 & MARCH 22, 2018
OPERATORS WELL NO. HEAVEN HILL 3-2HM
API WELL NO. 47 — 051 — 01962
STATE COUNTY PERMIT

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

| LINE | BEARING | DISTANCE |
|------|------------|----------|
| L1 | N 27°40' E | 1446.57' |
| L2 | N 66°12' E | 1244.40' |
| L3 | S 11°02' W | 122.24' |
| L4 | S 14°01' W | 1906.87' |

| CURVE | ARC LENGTH | RADIUS | CHORD BEARING | CHORD LENGTH |
|-------|------------|----------|---------------|--------------|
| C1 | 256.98' | 546.11' | S 04°15' E | 254.62' |
| C2 | 286.75' | 1264.63' | S 22°34' E | 286.13' |

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

LEGEND

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

09/11/2018

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