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west virginia department of environmental protection

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

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

March 1, 2018  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
1320 SOUTH UNIVERSITY DRIVE, SUITE 500

FORT WORTH , TX 76107

Re: Permit Modification Approval for HEAVEN HILL 3-1HM  
47-051-01935-00-00

**Modifying Bottom Hole Coordinates thereby Shortening 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 3-1HM  
Farm Name: WHITLATCH, RICKY L.  
U.S. WELL NUMBER: 47-051-01935-00-00  
Horizontal 6A / New Drill  
Date Issued: March 1, 2018

Promoting a healthy environment.

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

1) Well Operator: Tug Hill Operating, LLC      494510851      Marshall      Meade      Glen Easton 7.5'  
Operator ID      County      District      Quadrangle

2) Operator's Well Number: Heaven Hill 3-1HM      Well Pad Name: Heaven Hill 3

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

4) Elevation, current ground: 1339'      Elevation, proposed post-construction: 1326'

5) Well Type (a) Gas  Oil  Underground Storage

Other \_\_\_\_\_

(b) If Gas Shallow  Deep

Horizontal  \_\_\_\_\_

*JW*  
*2/5/18*

6) Existing Pad: Yes or No No

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: 15,640'

11) Proposed Horizontal Leg Length: 7,618'

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'

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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       WV Department of Environmental Protection

(a) If Yes, provide Mine Info: Name: Marshall County Coal Co. / Marshall County Mine  
Depth: 1031' TVD and 308' subsea level  
Seam: Pittsburgh #8  
Owner: Murray Energy / Consolidated Coal Co.

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'                         | 338FT^3(CTS)                  |
| Fresh Water  | 13 3/8"   | NEW         | H40   | 48#                    | 1,120'                     | 1,120'                       | 1142ft^3(CTS)                 |
| Coal         | 13 3/8"   | NEW         | H40   | 48#                    | 1,120'                     | 1,120'                       | 1142ft^3(CTS)                 |
| Intermediate | 9 5/8"    | NEW         | J55   | 36#                    | 2,805'                     | 2,805'                       | 897ft^3(CTS)                  |
| Production   | 5 1/2"    | NEW         | P110  | 20#                    | 15,640'                    | 15,640'                      | 3538ft^3(CTS)                 |
| Tubing       | 2 3/8"    | NEW         | N80   | 4.7#                   |                            | 7,841'                       |                               |
| Liners       |           |             |       |                        |                            |                              |                               |

*J*  
2/5/18

| TYPE         | Size (in) | Wellbore Diameter (in) | Wall Thickness (in) | Burst Pressure (psi) | Anticipated Max. Internal Pressure (psi) | Cement Type | Cement Yield (cu. ft./k) |
|--------------|-----------|------------------------|---------------------|----------------------|--|-------------|--------------------------|
| Conductor    | 30"       | 36"                    | 1.0                 | 2,333                | 1,866                                    | CLASS A     | 1.2                      |
| Fresh Water  | 13 3/8"   | 17 1/2"                | .33                 | 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               | 9,000                                    | 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 - 01935 **MOD**  
OPERATOR WELL NO. Heaven Hill 3-1HM  
Well Pad Name: Heaven Hill 3

*JW*  
*2/5/18*

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 28,740,000 lb proppant and 444,341 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.



## Tug Hill Operating, LLC Casing and Cement Program

### Heaven Hill 3-1HM

#### 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"        | 2,805'           | CTS            |
| Production   | 5 1/2"  | P110  | 8 7/8 x 8 3/4" | 15,640'          | 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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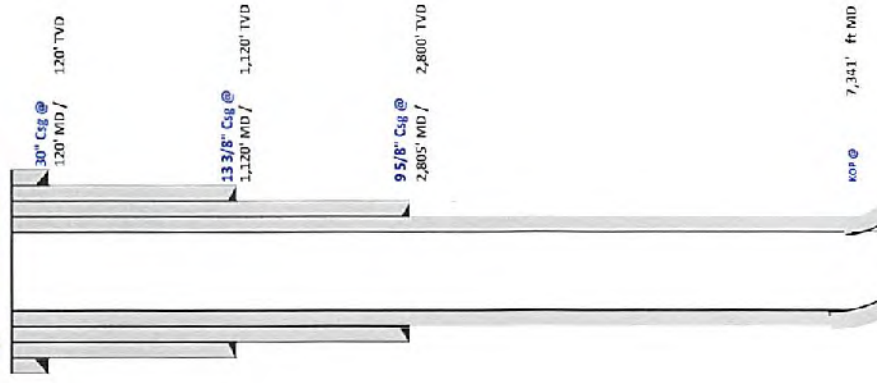
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61-01935 MOD



WELL NAME: Heaven Hill 3-11M  
 STATE: West Virginia COUNTY: Marshall  
 DISTRICT: Meade  
 DEPTH: 1,326' RI Elev: 1,326'  
 ID: 15,640'  
 Well Location: 35.80859972  
 Well Longitude: -80.69332114  
 Well Latitude: 35.782086  
 Well Longitude: -80.683101



| Formation           | Depth, TVD |
|---------------------|------------|
| Deepest Fresh Water | 1038       |
| Sandstone / Coal    | 946        |
| Pittsburgh Coal     | 1031       |
| Big Blaine          | 2060       |
| Webb                | 2486       |
| Berea               | 2684       |
| Gordon              | 2946       |
| Rhinestreet         | 6068       |
| Genesee/Burgett     | 6586       |
| Tully               | 6617       |
| Harrison            | 6650       |
| Marcellus           | 6724       |
| Landing Depth       | 6759       |
| Onondaga            | 6776       |
| Pilot Hole Depth    | 6876       |

| 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         | 2,805'     | 2,800'      | 36             | J55   | Surface       |
| Production     | 8 7/8 x 8 3/4  | 5 1/2         | 15,040'    | 5,302'      | 20             | P110  | Surface       |

| CEMENT SUMMARY |       | DRILLING DETAILS |             |
|----------------|-------|------------------|-------------|
| Seals          | Class | Density          | Fluid Type  |
| Conductor      | A     | 15.6             | Air         |
| Surface        | A     | 15.6             | Air         |
| Intermediate 1 | A     | 15               | Air         |
| Production     | A     | 14.5             | Air / SOBIM |

Centralizer Notes  
 None  
 3 Centralizers at equal distance  
 1 Centralizer every other ft  
 1 every other joint in lateral; 1 per joint in curve;  
 1 every other ft to stc

8/15/18

Pilot Hole  
 PH TD @ 6,876' TVD

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Off Landing Point @ 8,022' MD / 6,769' TVD  
 PH TD @ 100' below Onondaga Top

Lateral TD @ 15,640' RI MD  
 6,202' RI TVD

**Well:** Heaven Hill 3-1 HM  
**Site:** Heaven Hill 3  
**Project:** Marshall County, West Virginia  
**Design:** rev5



SECTION DETAILS

| Sec | MD       | Inc   | Azi    | TVD     | +M/S     | +E/W    | Dleg  | T/Face | V/Sect  | Annotation                     |
|-----|----------|-------|--------|---------|----------|---------|-------|--------|---------|--------------------------------|
| 1   | 0.00     | 0.00  | 0.00   | 0.00    | 0.00     | 0.00    | 0.00  | 0.00   | 0.00    |                                |
| 2   | 1200.00  | 0.00  | 0.00   | 1200.00 | 0.00     | 0.00    | 0.00  | 0.00   | 0.00    | KOP Begin 27'100' build        |
| 3   | 1450.00  | 5.00  | 200.00 | 1449.68 | -10.24   | -3.73   | 2.00  | 203.00 | 8.73    | Begin 5.00° tangent            |
| 4   | 2505.86  | 5.00  | 200.00 | 2505.18 | -542.52  | -197.46 | 3.00  | 0.00   | 110.39  | Begin 37'100' tangent          |
| 5   | 4072.52  | 40.00 | 200.00 | 3951.18 | -542.52  | -197.46 | 3.00  | 0.00   | 452.54  | Begin 40.00° tangent           |
| 6   | 5172.52  | 40.00 | 200.00 | 5556.87 | -1510.97 | -356.74 | 3.00  | 0.00   | 1543.99 | Begin 37'100' turn             |
| 7   | 6302.24  | 39.58 | 205.05 | 6656.30 | -1587.51 | -391.71 | 3.00  | 0.00   | 1607.98 | Begin 39.98° tangent           |
| 8   | 7340.57  | 39.58 | 205.05 | 6466.29 | -2487.12 | -364.86 | 3.00  | 0.00   | 2097.50 | Begin 107'100' build/turn      |
| 9   | 8022.38  | 89.00 | 150.03 | 6766.00 | -3046.39 | -900.86 | 10.00 | -83.31 | 2657.29 | Begin 89.00° lateral section   |
| 10  | 15640.08 | 89.00 | 150.03 | 6902.00 | -5544.40 | 2904.32 | 0.00  | 0.00   | 0072.22 | PBHLTD 15640.08 MD/6902.00 TVD |

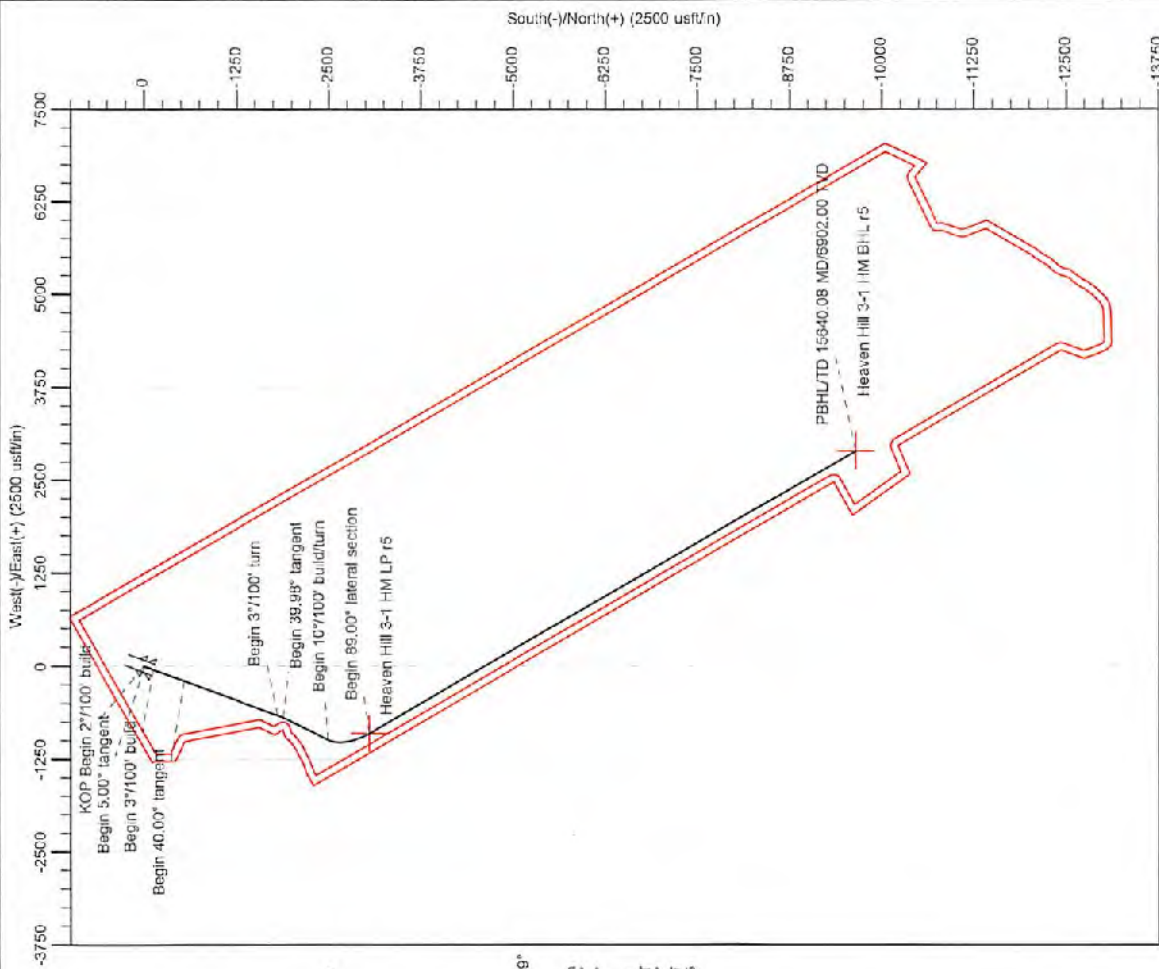
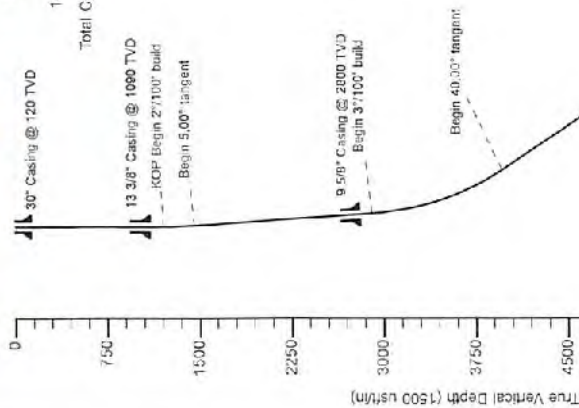
Geocentric System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD83, West Virginia - HARR  
 Ellipsoid: GRS 1990  
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level  
 Depth Reference: GL @ 1326.00usft

Northing 14457165.62 Easting 1726541.75  
 Latitude 39.80859972 Longitude -80.69332114

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.89°

Accumulates to Grid North  
 True North: -0.20°  
 Magnetic North: -8.89°  
 Magnetic Field  
 Strength: 50225.1usT  
 Dip Angle: 67.00°  
 Date: 2/29/2017  
 Model: IGRF2015



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**Area of Review****Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.**

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

## Data Sources Reviewed:

1. IHS Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Devin Ducoeur 724-705-0444, [dducoeur@dpslandservices.com](mailto:dducoeur@dpslandservices.com) DPS GIS (12/19/2016) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

## Request maps for:

1. Wellbore with IHS All Wells Layer
2. Map with Farm lines overlain and any well spots identified on Farm Maps
3. More recent (1970s vintage) topos and older topos

## Discussion with Phil Dinterman WVGES GIS Department (7/15/2016)

- WVGES has plotted every well spot they have access to and are aware of with that contains a coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some locations aren't great due to vintage and manipulation of maps through time
- 30000 series – any well drilled prior to 1929 – APIs were not assigned to original wells
- 70000 series – Well spots pulled from old Farm line maps that the WVGES has access to
- 90000 series – Any sources that the WVGES has access that shows a well spot but has no additional supporting information. DEP does not have 90000 series on their maps.
- There can be duplication between wells in the 3 series
- Phil indicated that other Operators are providing a screenshot of the WVGES map with their planned well and using that for permits



Permit well - Heaven Hill 3-1HM

Wells within 500' Buffer

Note: Well spots depicted on Area of Review map (page 3) are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots

| API Number | Operator Name    | Total Depth       | Perforated Fms | Producing zones not perforated | Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within range of fracture propagation | Comments  |
|------------|------------------|-------------------|----------------|--------------------------------|--|---|
| 4705101962 | Tug Hill         | 6737' TVD planned | None           | None                           | No, Permitted Marcellus well   | Permitted Marcellus well. Not yet drilled   |
| 4705101963 | Tug Hill         | 6737' TVD planned | None           | None                           | No, Permitted Marcellus well   | Permitted Marcellus well. Not yet drilled   |
| 4705101947 | Tug Hill         | 6737' TVD planned | None           | None                           | No, Permitted Marcellus well   | Permitted Marcellus well. Not yet drilled   |
| 4705101948 | Tug Hill         | 6737' TVD planned | None           | None                           | No, Permitted Marcellus well   | Permitted Marcellus well. Not yet drilled   |
| 4705100862 | Hope Natural Gas | Unknown           | Unknown        | Unknown                        | Unknown but unlikely, Appears to be an old shallow producing well that has since been plugged  | Old well, records are incomplete. A field survey was conducted to locate this well and it was found plugged at the location shown on the well plat. |
| 4705170788 | Hope Natural Gas | Unknown           | Unknown        | Unknown                        | Unknown but unlikely, Appears to be an old shallow producing well  | Old well, records are incomplete. A field survey was conducted to locate this well and no evidence of this well was found.                          |

WV Geological & Economic Survey

Well: County = 51 Permit = 00862

Well Reassignment Information: Reassigned From  
 OLD\_COUNTY OLD\_PERMIT NEW\_COUNTY NEW\_PERMIT  
 51 0000 51 0000

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAXL  | DISTRICT   | QUAD_78 | QUAD_16   | LAT_DD     | LONG_DD  | UTME      | UTMN |
|------------|----------|--------|-------|------------|---------|-----------|------------|----------|-----------|------|
| 4705100862 | Marshall | 882    | Meade | Old Easton | Cameron | 39°04'24" | -80°59'16" | 833979.8 | 4424063.9 |      |

There is no Bottom Hole Location data for this well

Owner Information:

| API        | CMP_DT     | SUFFIX | STATUS   | SURFACE_OWNER                        | WELL_NUM | CO_NUM | LEASE                 | LEASE_NUM | MINERAL_OWN              | OPERATOR_AT_COMPLETION   |
|------------|------------|--------|----------|--------------------------------------|----------|--------|-----------------------|-----------|--------------------------|--------------------------|
| 4705100862 | 11/14/2001 |        | Plugging | Consolidated David A Wheeler         | MC49     |        | Consolidation Coal Co |           | Consolidation Coal Co    | Consolidation Coal Co    |
| 4705100862 |            |        |          | Original Les Prop Map M E Givingsham | 724      |        |                       |           | Hope Natural Gas Company | Hope Natural Gas Company |

Completion Information:

| API        | CMP_DT     | SPUD_DT    | ELEV | DATUM | FIELD | DEEPEST_FM | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS  | TYPE | RIG           | CMP_MTHD | TVD     |
|------------|------------|------------|------|-------|-------|------------|-------------|---------------|--------------|------|---------------|----------|---------|
| 4705100862 | 11/14/2001 | 11/14/2001 |      |       |       |            |             | unclassified  | unclassified |      | not available | unknown  | unknown |
| 4705100862 |            |            |      |       |       |            |             | unclassified  | unclassified |      | not available | unknown  | unknown |

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well \*\* some operators may have reported NGL under Oil

There is no Production NGL data for this well \*\* some operators may have reported NGL under Oil

There is no Stratigraphy data for this well

There is no Wireline (E-Log) data for this well

Plugging Information

| API        | PLG_DT     | DEPTH_PFT |
|------------|------------|-----------|
| 4705100862 | 11/14/2001 | 0         |

WV Geological & Economic Survey

Well: County = 51 Permit = 70788

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAXL  | DISTRICT   | QUAD_78 | QUAD_16     | LAT_DD       | LONG_DD  | UTME      | UTMN |
|------------|----------|--------|-------|------------|---------|-------------|--------------|----------|-----------|------|
| 4705170788 | Marshall | 70788  | Meade | Old Easton | Cameron | 39°7'32.77" | -80°29'27.6" | 826544.7 | 4424415.4 |      |

There is no Bottom Hole Location data for this well

Owner Information:

| API        | CMP_DT | SUFFIX | STATUS | SURFACE_OWNER                    | WELL_NUM | CO_NUM | LEASE | LEASE_NUM | MINERAL_OWN              | OPERATOR_AT_COMPLETION   |
|------------|--------|--------|--------|----------------------------------|----------|--------|-------|-----------|--------------------------|--------------------------|
| 4705170788 |        |        |        | Original Prop Map G W Givingsham | 518      |        |       |           | Hope Natural Gas Company | Hope Natural Gas Company |

Completion Information:

| API        | CMP_DT | SPUD_DT | ELEV | DATUM | FIELD | DEEPEST_FM | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS  | TYPE | RIG           | CMP_MTHD | TVD     |
|------------|--------|---------|------|-------|-------|------------|-------------|---------------|--------------|------|---------------|----------|---------|
| 4705170788 |        |         |      |       |       |            |             | unclassified  | unclassified |      | not available | unknown  | unknown |

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well \*\* some operators may have reported NGL under Oil

There is no Production NGL data for this well \*\* some operators may have reported NGL under Oil

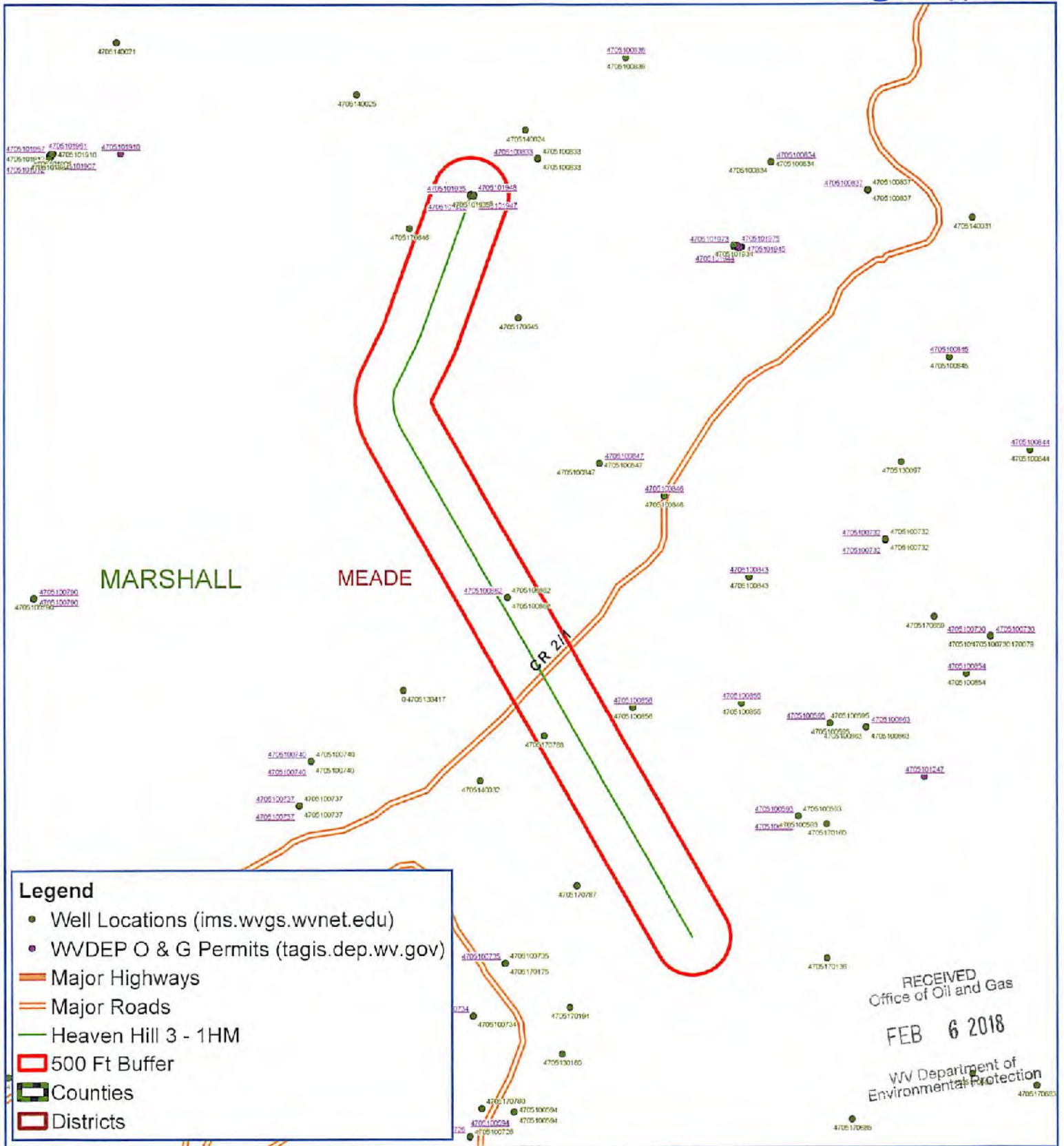
There is no Stratigraphy data for this well

There is no Wireline (E-Log) data for this well

There is no Plugging data for this well

There is no Sample data for this well

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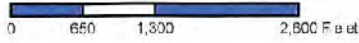
**Legend**

- Well Locations ([ims.wvgs.wvnet.edu](http://ims.wvgs.wvnet.edu))
- WVDEP O & G Permits ([tagis.dep.wv.gov](http://tagis.dep.wv.gov))
- Major Highways
- Major Roads
- Heaven Hill 3 - 1HM
- ▭ 500 Ft Buffer
- ▭ Counties
- ▭ Districts

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# Heaven Hill 3-1HM Meade District Marshall County, WV



Map Created: February 5, 2018  
Map Current As Of: February 5, 2018

Notes:  
All locations are approximate and are for visualization purposes only.





Planning Report - Geographic

|                  |                                |                                     |                         |
|------------------|--------------------------------|-------------------------------------|-------------------------|
| <b>Database:</b> | DB_Jul2216dt_v14               | <b>Local Co-ordinate Reference:</b> | Well Heaven Hill 3-1 HM |
| <b>Company:</b>  | Tug Hill Operating LLC         | <b>TVD Reference:</b>               | GL @ 1326.00usft        |
| <b>Project:</b>  | Marshall County, West Virginia | <b>MD Reference:</b>                | GL @ 1326.00usft        |
| <b>Site:</b>     | Heaven Hill 3                  | <b>North Reference:</b>             | Grid                    |
| <b>Well:</b>     | Heaven Hill 3-1 HM             | <b>Survey Calculation Method:</b>   | Minimum Curvature       |
| <b>Wellbore:</b> | Original Hole                  |                                     |                         |
| <b>Design:</b>   | rev5                           |                                     |                         |

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

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

|                             |                    |           |                            |                    |                      |               |
|-----------------------------|--------------------|-----------|----------------------------|--------------------|----------------------|---------------|
| <b>Well</b>                 | Heaven Hill 3-1 HM |           |                            |                    |                      |               |
| <b>Well Position</b>        | <b>+N/-S</b>       | 0.00 usft | <b>Northing:</b>           | 14,457,185.62 usft | <b>Latitude:</b>     | 39.80858972   |
|                             | <b>+E/-W</b>       | 0.00 usft | <b>Easting:</b>            | 1,726,541.76 usft  | <b>Longitude:</b>    | -80.69332114  |
| <b>Position Uncertainty</b> |                    | 0.00 usft | <b>Wellhead Elevation:</b> | 0.00 usft          | <b>Ground Level:</b> | 1,326.00 usft |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | Original Hole     |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2015          | 2/3/2017           | -8.69                  | 67.00                | 52,225.06573543            |

|                          |                                |                     |                      |                      |
|--------------------------|--------------------------------|---------------------|----------------------|----------------------|
| <b>Design</b>            | rev5                           |                     |                      |                      |
| <b>Audit Notes:</b>      |                                |                     |                      |                      |
| <b>Version:</b>          | <b>Phase:</b>                  | PLAN                | <b>Tie On Depth:</b> | 0.00                 |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b>  | <b>Direction (°)</b> |
|                          | 0.00                           | 0.00                | 0.00                 | 163.24               |

|                                 |                        |                                |                       |                |
|---------------------------------|------------------------|--------------------------------|-----------------------|----------------|
| <b>Plan Survey Tool Program</b> | <b>Date</b>            | 1/25/2018                      |                       |                |
| <b>Depth From (usft)</b>        | <b>Depth To (usft)</b> | <b>Survey (Wellbore)</b>       | <b>Tool Name</b>      | <b>Remarks</b> |
| 1                               | 0.00                   | 15,640.08 rev5 (Original Hole) | MWD<br>MWD - Standard |                |

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Planning Report - Geographic

|                  |                                |                                     |                         |
|------------------|--------------------------------|-------------------------------------|-------------------------|
| <b>Database:</b> | DB_Jul2216dt_v14               | <b>Local Co-ordinate Reference:</b> | Well Heaven Hill 3-1 HM |
| <b>Company:</b>  | Tug Hill Operating LLC         | <b>TVD Reference:</b>               | GL @ 1326.00usft        |
| <b>Project:</b>  | Marshall County, West Virginia | <b>MD Reference:</b>                | GL @ 1326.00usft        |
| <b>Site:</b>     | Heaven Hill 3                  | <b>North Reference:</b>             | Grid                    |
| <b>Well:</b>     | Heaven Hill 3-1 HM             | <b>Survey Calculation Method:</b>   | Minimum Curvature       |
| <b>Wellbore:</b> | Original Hole                  |                                     |                         |
| <b>Design:</b>   | rev5                           |                                     |                         |

| Plan Sections         |                 |             |                       |              |              |                         |                        |                       |         |                       |  |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|------------------------|-----------------------|---------|-----------------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | TFO (°) | Target                |  |
| 0.00                  | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                   | 0.00                  | 0.00    |                       |  |
| 1,200.00              | 0.00            | 0.00        | 1,200.00              | 0.00         | 0.00         | 0.00                    | 0.00                   | 0.00                  | 0.00    |                       |  |
| 1,450.00              | 5.00            | 200.00      | 1,449.68              | -10.24       | -3.73        | 2.00                    | 2.00                   | 0.00                  | 200.00  |                       |  |
| 2,905.86              | 5.00            | 200.00      | 2,900.00              | -129.48      | -47.13       | 0.00                    | 0.00                   | 0.00                  | 0.00    |                       |  |
| 4,072.52              | 40.00           | 200.00      | 3,961.18              | -542.52      | -197.46      | 3.00                    | 3.00                   | 0.00                  | 0.00    |                       |  |
| 6,172.52              | 40.00           | 200.00      | 5,569.87              | -1,810.97    | -659.14      | 0.00                    | 0.00                   | 0.00                  | 0.00    |                       |  |
| 6,302.24              | 39.98           | 206.06      | 5,669.30              | -1,887.61    | -691.71      | 3.00                    | -0.02                  | 4.67                  | 92.66   |                       |  |
| 7,340.97              | 39.98           | 206.06      | 6,465.29              | -2,487.12    | -984.86      | 0.00                    | 0.00                   | 0.00                  | 0.00    |                       |  |
| 8,022.38              | 89.00           | 150.03      | 6,769.00              | -3,046.39    | -900.66      | 10.00                   | 7.19                   | -8.22                 | -63.31  | Heaven Hill 3-1 HM LI |  |
| 15,640.08             | 89.00           | 150.03      | 6,902.00              | -9,644.40    | 2,904.32     | 0.00                    | 0.00                   | 0.00                  | 0.00    | Heaven Hill 3-1 HM B  |  |

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Planning Report - Geographic

Database: DB\_Jul2215dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia  
 Site: Heaven Hill 3  
 Well: Heaven Hill 3-1 HM  
 Wellbore: Original Hole  
 Design: rev5

Local Co-ordinate Reference: Well Heaven Hill 3-1 HM  
 TVD Reference: GL @ 1326.00usft  
 MD Reference: GL @ 1326.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

| Measured Depth (usft)          | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|--------------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 0.00                           | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 100.00                         | 0.00            | 0.00        | 100.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 200.00                         | 0.00            | 0.00        | 200.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 300.00                         | 0.00            | 0.00        | 300.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 400.00                         | 0.00            | 0.00        | 400.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 500.00                         | 0.00            | 0.00        | 500.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 600.00                         | 0.00            | 0.00        | 600.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 700.00                         | 0.00            | 0.00        | 700.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 800.00                         | 0.00            | 0.00        | 800.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 900.00                         | 0.00            | 0.00        | 900.00                | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 1,000.00                       | 0.00            | 0.00        | 1,000.00              | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 1,100.00                       | 0.00            | 0.00        | 1,100.00              | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| 1,200.00                       | 0.00            | 0.00        | 1,200.00              | 0.00         | 0.00         | 14,457,185.62       | 1,726,541.76       | 39.80859972 | -80.69332114 |
| <b>KOP Begin 2°/100' build</b> |                 |             |                       |              |              |                     |                    |             |              |
| 1,300.00                       | 2.00            | 200.00      | 1,299.98              | -1.64        | -0.80        | 14,457,183.98       | 1,726,541.16       | 39.80859522 | -80.69332329 |
| 1,400.00                       | 4.00            | 200.00      | 1,399.84              | -6.56        | -2.39        | 14,457,179.07       | 1,726,539.37       | 39.80858174 | -80.69332972 |
| 1,450.00                       | 5.00            | 200.00      | 1,449.68              | -10.24       | -3.73        | 14,457,175.38       | 1,726,538.03       | 39.80857162 | -80.69333454 |
| <b>Begin 5.00° tangent</b>     |                 |             |                       |              |              |                     |                    |             |              |
| 1,500.00                       | 5.00            | 200.00      | 1,499.49              | -14.34       | -5.22        | 14,457,171.29       | 1,726,536.54       | 39.80856039 | -80.69333990 |
| 1,600.00                       | 5.00            | 200.00      | 1,589.11              | -22.53       | -8.20        | 14,457,163.10       | 1,726,533.56       | 39.80853793 | -80.69335061 |
| 1,700.00                       | 5.00            | 200.00      | 1,696.73              | -30.72       | -11.18       | 14,457,154.91       | 1,726,530.58       | 39.80851547 | -80.69336133 |
| 1,800.00                       | 5.00            | 200.00      | 1,796.35              | -38.91       | -14.16       | 14,457,146.72       | 1,726,527.60       | 39.80849300 | -80.69337204 |
| 1,900.00                       | 5.00            | 200.00      | 1,897.97              | -47.10       | -17.14       | 14,457,138.53       | 1,726,524.62       | 39.80847054 | -80.69338276 |
| 2,000.00                       | 5.00            | 200.00      | 1,997.59              | -55.29       | -20.12       | 14,457,130.34       | 1,726,521.64       | 39.80844807 | -80.69339347 |
| 2,100.00                       | 5.00            | 200.00      | 2,097.21              | -63.48       | -23.10       | 14,457,122.15       | 1,726,518.66       | 39.80842561 | -80.69340418 |
| 2,200.00                       | 5.00            | 200.00      | 2,196.83              | -71.67       | -26.09       | 14,457,113.96       | 1,726,515.67       | 39.80840315 | -80.69341490 |
| 2,300.00                       | 5.00            | 200.00      | 2,296.45              | -79.86       | -29.07       | 14,457,105.77       | 1,726,512.69       | 39.80838068 | -80.69342561 |
| 2,400.00                       | 5.00            | 200.00      | 2,396.07              | -88.05       | -32.05       | 14,457,097.58       | 1,726,509.71       | 39.80835822 | -80.69343633 |
| 2,500.00                       | 5.00            | 200.00      | 2,495.69              | -96.24       | -35.03       | 14,457,089.39       | 1,726,506.73       | 39.80833576 | -80.69344704 |
| 2,600.00                       | 5.00            | 200.00      | 2,595.31              | -104.43      | -38.01       | 14,457,081.20       | 1,726,503.75       | 39.80831329 | -80.69345776 |
| 2,700.00                       | 5.00            | 200.00      | 2,694.93              | -112.62      | -40.99       | 14,457,073.01       | 1,726,500.77       | 39.80829083 | -80.69346847 |
| 2,800.00                       | 5.00            | 200.00      | 2,794.55              | -120.81      | -43.97       | 14,457,064.82       | 1,726,497.79       | 39.80826837 | -80.69347918 |
| 2,900.00                       | 5.00            | 200.00      | 2,894.17              | -129.00      | -46.95       | 14,457,056.63       | 1,726,494.81       | 39.80824590 | -80.69348990 |
| 2,905.86                       | 5.00            | 200.00      | 2,900.00              | -129.48      | -47.13       | 14,457,056.15       | 1,726,494.63       | 39.80824459 | -80.69349053 |
| <b>Begin 3°/100' build</b>     |                 |             |                       |              |              |                     |                    |             |              |
| 3,000.00                       | 7.82            | 200.00      | 2,993.54              | -139.36      | -50.72       | 14,457,046.27       | 1,726,491.04       | 39.80821749 | -80.69350345 |
| 3,100.00                       | 10.82           | 200.00      | 3,092.21              | -154.58      | -56.26       | 14,457,031.04       | 1,726,485.50       | 39.80817574 | -80.69352337 |
| 3,200.00                       | 13.82           | 200.00      | 3,189.90              | -174.64      | -63.56       | 14,457,010.99       | 1,726,478.20       | 39.80812073 | -80.69354960 |
| 3,300.00                       | 16.82           | 200.00      | 3,286.33              | -199.47      | -72.60       | 14,456,986.16       | 1,726,469.16       | 39.80805262 | -80.69358209 |
| 3,400.00                       | 19.82           | 200.00      | 3,381.25              | -229.01      | -83.35       | 14,456,956.62       | 1,726,458.41       | 39.80797160 | -80.69362073 |
| 3,500.00                       | 22.82           | 200.00      | 3,474.39              | -263.17      | -95.79       | 14,456,922.45       | 1,726,445.97       | 39.80787788 | -80.69366543 |
| 3,600.00                       | 25.82           | 200.00      | 3,565.50              | -301.88      | -109.87      | 14,456,883.75       | 1,726,431.88       | 39.80777173 | -80.69371606 |
| 3,700.00                       | 28.82           | 200.00      | 3,654.34              | -345.01      | -125.57      | 14,456,840.62       | 1,726,416.19       | 39.80765343 | -80.69377248 |
| 3,800.00                       | 31.82           | 200.00      | 3,740.64              | -392.44      | -142.84      | 14,456,793.18       | 1,726,398.92       | 39.80752332 | -80.69383454 |
| 3,900.00                       | 34.82           | 200.00      | 3,824.19              | -444.06      | -161.83      | 14,456,741.56       | 1,726,380.13       | 39.80738174 | -80.69390207 |
| 4,000.00                       | 37.82           | 200.00      | 3,904.75              | -499.72      | -181.88      | 14,456,685.90       | 1,726,359.68       | 39.80722908 | -80.69397488 |
| 4,072.52                       | 40.00           | 200.00      | 3,961.18              | -542.52      | -197.46      | 14,456,643.10       | 1,726,344.30       | 39.80711167 | -80.69403087 |
| <b>Begin 40.00° tangent</b>    |                 |             |                       |              |              |                     |                    |             |              |
| 4,100.00                       | 40.00           | 200.00      | 3,982.23              | -559.12      | -203.50      | 14,456,626.50       | 1,726,338.26       | 39.80706615 | -80.69405258 |
| 4,200.00                       | 40.00           | 200.00      | 4,058.83              | -619.52      | -225.49      | 14,456,566.10       | 1,726,316.27       | 39.80690048 | -80.69413160 |
| 4,300.00                       | 40.00           | 200.00      | 4,135.44              | -679.93      | -247.47      | 14,456,505.70       | 1,726,294.29       | 39.80673461 | -80.69421061 |
| 4,400.00                       | 40.00           | 200.00      | 4,212.04              | -740.33      | -269.46      | 14,456,445.30       | 1,726,272.30       | 39.80656913 | -80.69428963 |
| 4,500.00                       | 40.00           | 200.00      | 4,288.64              | -800.73      | -291.44      | 14,456,384.90       | 1,726,250.32       | 39.80640346 | -80.69436865 |
| 4,600.00                       | 40.00           | 200.00      | 4,365.25              | -861.13      | -313.43      | 14,456,324.49       | 1,726,228.33       | 39.80623779 | -80.69444766 |



Planning Report - Geographic

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia  
 Site: Heaven Hill 3  
 Well: Heaven Hill 3-1 HM  
 Wellbore: Original Hole  
 Design: rev5

Local Co-ordinate Reference: Well Heaven Hill 3-1 HM  
 TVD Reference: GL @ 1326.00usft  
 MD Reference: GL @ 1326.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

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| Measured Depth (usft)               | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N-S (usft) | +E-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|-------------------------------------|-----------------|-------------|-----------------------|-------------|-------------|---------------------|--------------------|-------------|--------------|
| 4,700.00                            | 40.00           | 200.00      | 4,441.85              | -921.53     | -335.41     | 14,456,264.09       | 1,726,206.35       | 39.80607211 | -80.69452667 |
| 4,800.00                            | 40.00           | 200.00      | 4,518.46              | -931.94     | -357.40     | 14,456,203.69       | 1,726,184.36       | 39.80590644 | -80.69460569 |
| 4,900.00                            | 40.00           | 200.00      | 4,595.06              | -1,042.34   | -379.38     | 14,456,143.29       | 1,726,162.38       | 39.80574077 | -80.69468470 |
| 5,000.00                            | 40.00           | 200.00      | 4,671.67              | -1,102.74   | -401.36     | 14,456,082.88       | 1,726,140.39       | 39.80557509 | -80.69476372 |
| 5,100.00                            | 40.00           | 200.00      | 4,748.27              | -1,163.14   | -423.35     | 14,456,022.48       | 1,726,118.41       | 39.80540942 | -80.69484273 |
| 5,200.00                            | 40.00           | 200.00      | 4,824.88              | -1,223.55   | -445.33     | 14,455,962.08       | 1,726,096.42       | 39.80524374 | -80.69492174 |
| 5,300.00                            | 40.00           | 200.00      | 4,901.48              | -1,283.95   | -467.32     | 14,455,901.68       | 1,726,074.44       | 39.80507807 | -80.69500075 |
| 5,400.00                            | 40.00           | 200.00      | 4,978.08              | -1,344.35   | -489.30     | 14,455,841.27       | 1,726,052.46       | 39.80491240 | -80.69507976 |
| 5,500.00                            | 40.00           | 200.00      | 5,054.69              | -1,404.75   | -511.29     | 14,455,780.87       | 1,726,030.47       | 39.80474672 | -80.69515978 |
| 5,600.00                            | 40.00           | 200.00      | 5,131.29              | -1,465.15   | -533.27     | 14,455,720.47       | 1,726,008.49       | 39.80458105 | -80.69523779 |
| 5,700.00                            | 40.00           | 200.00      | 5,207.90              | -1,525.56   | -555.26     | 14,455,660.07       | 1,725,986.50       | 39.80441538 | -80.69531680 |
| 5,800.00                            | 40.00           | 200.00      | 5,284.50              | -1,585.96   | -577.24     | 14,455,599.67       | 1,725,964.52       | 39.80424970 | -80.69539581 |
| 5,900.00                            | 40.00           | 200.00      | 5,361.11              | -1,646.36   | -599.23     | 14,455,539.26       | 1,725,942.53       | 39.80408403 | -80.69547482 |
| 6,000.00                            | 40.00           | 200.00      | 5,437.71              | -1,706.76   | -621.21     | 14,455,478.86       | 1,725,920.55       | 39.80391835 | -80.69555383 |
| 6,100.00                            | 40.00           | 200.00      | 5,514.32              | -1,767.17   | -643.20     | 14,455,418.46       | 1,725,898.56       | 39.80375268 | -80.69563284 |
| 6,172.52                            | 40.00           | 200.00      | 5,569.87              | -1,810.97   | -659.14     | 14,455,374.65       | 1,725,882.62       | 39.80363253 | -80.69569014 |
| <b>Begin 3°/100' turn</b>           |                 |             |                       |             |             |                     |                    |             |              |
| 6,200.00                            | 39.97           | 201.26      | 5,590.93              | -1,827.49   | -665.36     | 14,455,358.13       | 1,725,876.40       | 39.80358721 | -80.69571250 |
| 6,300.00                            | 39.97           | 205.95      | 5,667.58              | -1,886.32   | -691.08     | 14,455,299.31       | 1,725,850.67       | 39.80342591 | -80.69580479 |
| 6,302.24                            | 39.96           | 205.06      | 5,669.30              | -1,887.61   | -691.71     | 14,455,298.01       | 1,725,850.04       | 39.80342235 | -80.69580705 |
| <b>Begin 39.98° tangent</b>         |                 |             |                       |             |             |                     |                    |             |              |
| 6,400.00                            | 39.98           | 206.06      | 5,744.21              | -1,944.03   | -719.30     | 14,455,241.59       | 1,725,822.45       | 39.80326767 | -80.69590596 |
| 6,500.00                            | 39.98           | 206.06      | 5,820.84              | -2,001.75   | -747.53     | 14,455,183.87       | 1,725,794.23       | 39.80310943 | -80.69600714 |
| 6,600.00                            | 39.98           | 206.06      | 5,897.46              | -2,059.47   | -775.75     | 14,455,126.16       | 1,725,766.01       | 39.80295119 | -80.69610932 |
| 6,700.00                            | 39.98           | 206.06      | 5,974.11              | -2,117.18   | -803.97     | 14,455,068.44       | 1,725,737.79       | 39.80279295 | -80.69620950 |
| 6,800.00                            | 39.98           | 206.06      | 6,050.74              | -2,174.90   | -832.19     | 14,455,010.73       | 1,725,709.57       | 39.80263471 | -80.69631068 |
| 6,900.00                            | 39.98           | 206.06      | 6,127.37              | -2,232.61   | -860.41     | 14,454,953.01       | 1,725,681.35       | 39.80247647 | -80.69641186 |
| 7,000.00                            | 39.98           | 206.06      | 6,204.00              | -2,290.33   | -888.63     | 14,454,895.29       | 1,725,653.13       | 39.80231823 | -80.69651304 |
| 7,100.00                            | 39.98           | 206.06      | 6,280.63              | -2,348.05   | -916.85     | 14,454,837.58       | 1,725,624.91       | 39.80215999 | -80.69661422 |
| 7,200.00                            | 39.98           | 206.06      | 6,357.27              | -2,405.76   | -945.07     | 14,454,779.86       | 1,725,596.68       | 39.80200175 | -80.69671539 |
| 7,300.00                            | 39.98           | 206.06      | 6,433.90              | -2,463.48   | -973.30     | 14,454,722.15       | 1,725,568.46       | 39.80184351 | -80.69681657 |
| 7,340.97                            | 39.98           | 206.06      | 6,465.29              | -2,487.12   | -984.86     | 14,454,698.50       | 1,725,556.90       | 39.80177868 | -80.69685802 |
| <b>Begin 10°/100' build/turn</b>    |                 |             |                       |             |             |                     |                    |             |              |
| 7,400.00                            | 42.90           | 198.30      | 6,509.57              | -2,523.27   | -999.51     | 14,454,662.36       | 1,725,542.25       | 39.80167956 | -80.69691062 |
| 7,500.00                            | 48.86           | 167.09      | 6,579.27              | -2,593.12   | -1,014.88   | 14,454,592.50       | 1,725,526.88       | 39.80148785 | -80.69696819 |
| 7,600.00                            | 55.72           | 177.87      | 6,640.49              | -2,671.98   | -1,018.00   | 14,454,513.65       | 1,725,523.76       | 39.80127133 | -80.69697825 |
| 7,700.00                            | 63.16           | 170.10      | 6,691.35              | -2,757.43   | -1,008.77   | 14,454,428.19       | 1,725,532.99       | 39.80103657 | -80.69694542 |
| 7,800.00                            | 70.97           | 163.31      | 6,730.32              | -2,846.89   | -987.47     | 14,454,338.74       | 1,725,554.29       | 39.80079071 | -80.69687168 |
| 7,900.00                            | 79.01           | 157.15      | 6,756.22              | -2,937.63   | -954.76     | 14,454,248.00       | 1,725,587.00       | 39.80054121 | -80.69675629 |
| 8,000.00                            | 87.17           | 151.31      | 6,788.25              | -3,026.89   | -911.62     | 14,454,158.73       | 1,725,630.14       | 39.80029566 | -80.69660377 |
| 8,022.38                            | 89.00           | 150.03      | 6,769.00              | -3,046.39   | -900.65     | 14,454,139.23       | 1,725,641.10       | 39.80024200 | -80.69656500 |
| <b>Begin 89.00° lateral section</b> |                 |             |                       |             |             |                     |                    |             |              |
| 8,100.00                            | 89.00           | 150.03      | 6,770.36              | -3,113.62   | -861.89     | 14,454,072.00       | 1,725,679.87       | 39.80005701 | -80.69642778 |
| 8,200.00                            | 89.00           | 150.03      | 6,772.10              | -3,200.24   | -811.94     | 14,453,985.39       | 1,725,729.82       | 39.79981868 | -80.69625096 |
| 8,300.00                            | 89.00           | 150.03      | 6,773.85              | -3,286.85   | -761.99     | 14,453,898.77       | 1,725,779.77       | 39.79958035 | -80.69607419 |
| 8,400.00                            | 89.00           | 150.03      | 6,775.59              | -3,373.47   | -712.04     | 14,453,812.16       | 1,725,829.71       | 39.79934202 | -80.69589741 |
| 8,500.00                            | 89.00           | 150.03      | 6,777.34              | -3,460.08   | -662.09     | 14,453,725.54       | 1,725,879.66       | 39.79910369 | -80.69572082 |
| 8,600.00                            | 89.00           | 150.03      | 6,779.09              | -3,546.69   | -612.15     | 14,453,638.93       | 1,725,929.61       | 39.79886536 | -80.69554383 |
| 8,700.00                            | 89.00           | 150.03      | 6,780.83              | -3,633.31   | -562.20     | 14,453,552.32       | 1,725,979.56       | 39.79862703 | -80.69536705 |
| 8,800.00                            | 89.00           | 150.03      | 6,782.58              | -3,719.92   | -512.25     | 14,453,465.70       | 1,726,029.51       | 39.79838870 | -80.69519026 |
| 8,900.00                            | 89.00           | 150.03      | 6,784.32              | -3,806.54   | -462.30     | 14,453,379.09       | 1,726,079.46       | 39.79815037 | -80.69501348 |
| 9,000.00                            | 88.00           | 150.03      | 6,786.07              | -3,893.15   | -412.35     | 14,453,292.47       | 1,726,129.41       | 39.79791204 | -80.69483670 |
| 9,100.00                            | 89.00           | 150.03      | 6,787.81              | -3,979.77   | -362.40     | 14,453,205.86       | 1,726,179.36       | 39.79767370 | -80.69465992 |
| 9,200.00                            | 89.00           | 150.03      | 6,789.56              | -4,066.38   | -312.45     | 14,453,119.25       | 1,726,229.31       | 39.79743537 | -80.69448314 |



Planning Report - Geographic

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia  
 Site: Heaven Hill 3  
 Well: Heaven Hill 3-1 HM  
 Wellbore: Original Hole  
 Design: rev5

Local Co-ordinate Reference: Well Heaven Hill 3-1 HM  
 TVD Reference: GL @ 1326.00usft  
 MD Reference: GL @ 1326.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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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    |
|-----------------------|-----------------|-------------|-----------------------|-------------|-------------|---------------------|--------------------|-------------|--------------|
| 9,300.00              | 89.00           | 150.03      | 6,791.31              | -4,152.99   | -262.50     | 14,453,032.63       | 1,726,279.26       | 39.79719704 | -80.69430636 |
| 9,400.00              | 89.00           | 150.03      | 6,793.05              | -4,239.81   | -212.55     | 14,452,946.02       | 1,726,329.21       | 39.79695871 | -80.69412959 |
| 9,500.00              | 89.00           | 150.03      | 6,794.80              | -4,326.22   | -162.60     | 14,452,859.40       | 1,726,379.16       | 39.79672037 | -80.69395281 |
| 9,600.00              | 89.00           | 150.03      | 6,796.54              | -4,412.84   | -112.65     | 14,452,772.79       | 1,726,429.11       | 39.79648204 | -80.69377604 |
| 9,700.00              | 89.00           | 150.03      | 6,798.29              | -4,499.45   | -62.70      | 14,452,686.17       | 1,726,479.06       | 39.79624370 | -80.69359926 |
| 9,800.00              | 89.00           | 150.03      | 6,800.04              | -4,586.06   | -12.75      | 14,452,599.56       | 1,726,529.00       | 39.79600537 | -80.69342249 |
| 9,900.00              | 89.00           | 150.03      | 6,801.78              | -4,672.68   | 37.19       | 14,452,512.95       | 1,726,578.95       | 39.79576704 | -80.69324572 |
| 10,000.00             | 89.00           | 150.03      | 6,803.53              | -4,759.29   | 87.14       | 14,452,426.33       | 1,726,628.90       | 39.79552870 | -80.69306885 |
| 10,100.00             | 89.00           | 150.03      | 6,805.27              | -4,845.91   | 137.09      | 14,452,339.72       | 1,726,678.85       | 39.79529037 | -80.69289218 |
| 10,200.00             | 89.00           | 150.03      | 6,807.02              | -4,932.52   | 187.04      | 14,452,253.10       | 1,726,728.80       | 39.79505203 | -80.69271542 |
| 10,300.00             | 89.00           | 150.03      | 6,808.77              | -5,019.14   | 236.99      | 14,452,166.49       | 1,726,778.75       | 39.79481370 | -80.69253865 |
| 10,400.00             | 89.00           | 150.03      | 6,810.51              | -5,105.75   | 286.94      | 14,452,079.87       | 1,726,828.70       | 39.79457536 | -80.69236189 |
| 10,500.00             | 89.00           | 150.03      | 6,812.26              | -5,192.36   | 336.89      | 14,451,993.26       | 1,726,878.65       | 39.79433702 | -80.69218512 |
| 10,600.00             | 89.00           | 150.03      | 6,814.00              | -5,278.98   | 386.84      | 14,451,906.65       | 1,726,928.60       | 39.79409869 | -80.69200836 |
| 10,700.00             | 89.00           | 150.03      | 6,815.75              | -5,365.59   | 436.79      | 14,451,820.03       | 1,726,978.55       | 39.79386035 | -80.69183160 |
| 10,800.00             | 89.00           | 150.03      | 6,817.50              | -5,452.21   | 486.74      | 14,451,733.42       | 1,727,028.50       | 39.79362202 | -80.69165484 |
| 10,900.00             | 89.00           | 150.03      | 6,819.24              | -5,538.82   | 536.69      | 14,451,646.80       | 1,727,078.45       | 39.79338368 | -80.69147808 |
| 11,000.00             | 89.00           | 150.03      | 6,820.99              | -5,625.44   | 586.64      | 14,451,560.19       | 1,727,128.40       | 39.79314534 | -80.69130133 |
| 11,100.00             | 89.00           | 150.03      | 6,822.73              | -5,712.05   | 636.59      | 14,451,473.57       | 1,727,178.34       | 39.79290700 | -80.69112457 |
| 11,200.00             | 89.00           | 150.03      | 6,824.48              | -5,798.66   | 686.54      | 14,451,386.96       | 1,727,228.29       | 39.79266867 | -80.69094782 |
| 11,300.00             | 89.00           | 150.03      | 6,826.23              | -5,885.28   | 736.48      | 14,451,300.35       | 1,727,278.24       | 39.79243033 | -80.69077106 |
| 11,400.00             | 89.00           | 150.03      | 6,827.97              | -5,971.89   | 786.43      | 14,451,213.73       | 1,727,328.19       | 39.79219199 | -80.69059431 |
| 11,500.00             | 89.00           | 150.03      | 6,829.72              | -6,058.51   | 836.38      | 14,451,127.12       | 1,727,378.14       | 39.79195365 | -80.69041756 |
| 11,600.00             | 89.00           | 150.03      | 6,831.46              | -6,145.12   | 886.33      | 14,451,040.50       | 1,727,428.09       | 39.79171531 | -80.69024081 |
| 11,700.00             | 89.00           | 150.03      | 6,833.21              | -6,231.74   | 936.28      | 14,450,953.89       | 1,727,478.04       | 39.79147697 | -80.69006406 |
| 11,800.00             | 89.00           | 150.03      | 6,834.95              | -6,318.35   | 986.23      | 14,450,867.28       | 1,727,527.99       | 39.79123863 | -80.68988731 |
| 11,900.00             | 89.00           | 150.03      | 6,836.70              | -6,404.96   | 1,036.18    | 14,450,780.66       | 1,727,577.94       | 39.79100029 | -80.68971057 |
| 12,000.00             | 89.00           | 150.03      | 6,838.45              | -6,491.58   | 1,086.13    | 14,450,694.05       | 1,727,627.89       | 39.79076195 | -80.68953382 |
| 12,100.00             | 89.00           | 150.03      | 6,840.19              | -6,578.19   | 1,136.08    | 14,450,607.43       | 1,727,677.84       | 39.79052361 | -80.68935708 |
| 12,200.00             | 89.00           | 150.03      | 6,841.94              | -6,664.81   | 1,186.03    | 14,450,520.82       | 1,727,727.79       | 39.79028527 | -80.68918034 |
| 12,300.00             | 89.00           | 150.03      | 6,843.68              | -6,751.42   | 1,235.98    | 14,450,434.20       | 1,727,777.74       | 39.79004693 | -80.68900360 |
| 12,400.00             | 89.00           | 150.03      | 6,845.43              | -6,838.03   | 1,285.93    | 14,450,347.59       | 1,727,827.68       | 39.78980859 | -80.68882686 |
| 12,500.00             | 89.00           | 150.03      | 6,847.18              | -6,924.65   | 1,335.88    | 14,450,260.98       | 1,727,877.63       | 39.78957025 | -80.68865012 |
| 12,600.00             | 89.00           | 150.03      | 6,848.92              | -7,011.26   | 1,385.82    | 14,450,174.36       | 1,727,927.58       | 39.78933191 | -80.68847338 |
| 12,700.00             | 89.00           | 150.03      | 6,850.67              | -7,097.88   | 1,435.77    | 14,450,087.75       | 1,727,977.53       | 39.78909356 | -80.68829664 |
| 12,800.00             | 89.00           | 150.03      | 6,852.41              | -7,184.49   | 1,485.72    | 14,450,001.13       | 1,728,027.48       | 39.78885522 | -80.68811991 |
| 12,900.00             | 89.00           | 150.03      | 6,854.16              | -7,271.11   | 1,535.67    | 14,449,914.52       | 1,728,077.43       | 39.78861688 | -80.68794317 |
| 13,000.00             | 89.00           | 150.03      | 6,855.91              | -7,357.72   | 1,585.62    | 14,449,827.90       | 1,728,127.38       | 39.78837854 | -80.68776644 |
| 13,100.00             | 89.00           | 150.03      | 6,857.65              | -7,444.33   | 1,635.57    | 14,449,741.29       | 1,728,177.33       | 39.78814019 | -80.68758971 |
| 13,200.00             | 89.00           | 150.03      | 6,859.40              | -7,530.95   | 1,685.52    | 14,449,654.68       | 1,728,227.28       | 39.78790185 | -80.68741298 |
| 13,300.00             | 89.00           | 150.03      | 6,861.14              | -7,617.56   | 1,735.47    | 14,449,568.06       | 1,728,277.23       | 39.78766351 | -80.68723625 |
| 13,400.00             | 89.00           | 150.03      | 6,862.89              | -7,704.18   | 1,785.42    | 14,449,481.45       | 1,728,327.18       | 39.78742516 | -80.68705952 |
| 13,500.00             | 89.00           | 150.03      | 6,864.64              | -7,790.79   | 1,835.37    | 14,449,394.83       | 1,728,377.13       | 39.78718682 | -80.68688280 |
| 13,600.00             | 89.00           | 150.03      | 6,866.38              | -7,877.41   | 1,885.32    | 14,449,308.22       | 1,728,427.08       | 39.78694847 | -80.68670607 |
| 13,700.00             | 89.00           | 150.03      | 6,868.13              | -7,964.02   | 1,935.27    | 14,449,221.60       | 1,728,477.03       | 39.78671013 | -80.68652935 |
| 13,800.00             | 89.00           | 150.03      | 6,869.87              | -8,050.63   | 1,985.22    | 14,449,134.99       | 1,728,526.97       | 39.78647178 | -80.68635262 |
| 13,900.00             | 89.00           | 150.03      | 6,871.62              | -8,137.25   | 2,035.16    | 14,449,048.38       | 1,728,576.92       | 39.78623344 | -80.68617590 |
| 14,000.00             | 89.00           | 150.03      | 6,873.37              | -8,223.86   | 2,085.11    | 14,448,961.76       | 1,728,626.87       | 39.78599509 | -80.68599918 |
| 14,100.00             | 89.00           | 150.03      | 6,875.11              | -8,310.48   | 2,135.06    | 14,448,875.15       | 1,728,676.82       | 39.78575675 | -80.68582246 |
| 14,200.00             | 89.00           | 150.03      | 6,876.86              | -8,397.09   | 2,185.01    | 14,448,788.53       | 1,728,726.77       | 39.78551840 | -80.68564574 |
| 14,300.00             | 89.00           | 150.03      | 6,878.60              | -8,483.71   | 2,234.96    | 14,448,701.92       | 1,728,776.72       | 39.78528005 | -80.68546903 |
| 14,400.00             | 89.00           | 150.03      | 6,880.35              | -8,570.32   | 2,284.91    | 14,448,615.31       | 1,728,826.67       | 39.78504171 | -80.68529231 |
| 14,500.00             | 89.00           | 150.03      | 6,882.10              | -8,656.93   | 2,334.86    | 14,448,528.69       | 1,728,876.62       | 39.78480336 | -80.68511560 |
| 14,600.00             | 89.00           | 150.03      | 6,883.84              | -8,743.55   | 2,384.81    | 14,448,442.08       | 1,728,926.57       | 39.78456501 | -80.68493888 |
| 14,700.00             | 89.00           | 150.03      | 6,885.59              | -8,830.16   | 2,434.76    | 14,448,355.46       | 1,728,976.52       | 39.78432667 | -80.68476217 |



Planning Report - Geographic

|                  |                                |                                     |                         |
|------------------|--------------------------------|-------------------------------------|-------------------------|
| <b>Database:</b> | DB_Jul2216dt_v14               | <b>Local Co-ordinate Reference:</b> | Well Heaven Hill 3-1 HM |
| <b>Company:</b>  | Tug Hill Operating LLC         | <b>TVD Reference:</b>               | GL @ 1326.00usft        |
| <b>Project:</b>  | Marshall County, West Virginia | <b>MD Reference:</b>                | GL @ 1326.00usft        |
| <b>Site:</b>     | Heaven Hill 3                  | <b>North Reference:</b>             | Grid                    |
| <b>Well:</b>     | Heaven Hill 3-1 HM             | <b>Survey Calculation Method:</b>   | Minimum Curvature       |
| <b>Wellbore:</b> | Original Hole                  |                                     |                         |
| <b>Design:</b>   | rev5                           |                                     |                         |

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| Planned Survey        |                 |             |                       |              |              |                     |                    |             |              |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
| 14,800.00             | 89.00           | 150.03      | 6,887.33              | -8,916.78    | 2,484.71     | 14,448,268.85       | 1,729,026.47       | 39.78408832 | -80.68458546 |
| 14,900.00             | 89.00           | 150.03      | 6,889.08              | -9,003.39    | 2,534.66     | 14,448,182.23       | 1,729,076.42       | 39.78384997 | -80.68440875 |
| 15,000.00             | 89.00           | 150.03      | 6,890.82              | -9,090.00    | 2,584.61     | 14,448,095.62       | 1,729,126.37       | 39.78361162 | -80.68423204 |
| 15,100.00             | 89.00           | 150.03      | 6,892.57              | -9,176.62    | 2,634.56     | 14,448,009.01       | 1,729,176.31       | 39.78337327 | -80.68405533 |
| 15,200.00             | 89.00           | 150.03      | 6,894.32              | -9,263.23    | 2,684.51     | 14,447,922.39       | 1,729,226.26       | 39.78313492 | -80.68387863 |
| 15,300.00             | 89.00           | 150.03      | 6,896.06              | -9,349.85    | 2,734.45     | 14,447,835.78       | 1,729,276.21       | 39.78289658 | -80.68370192 |
| 15,400.00             | 89.00           | 150.03      | 6,897.81              | -9,436.46    | 2,784.40     | 14,447,749.16       | 1,729,326.16       | 39.78265823 | -80.68352522 |
| 15,500.00             | 89.00           | 150.03      | 6,899.55              | -9,523.08    | 2,834.35     | 14,447,662.55       | 1,729,376.11       | 39.78241988 | -80.68334852 |
| 15,600.00             | 89.00           | 150.03      | 6,901.30              | -9,609.69    | 2,884.30     | 14,447,575.93       | 1,729,426.06       | 39.78218153 | -80.68317182 |
| 15,640.08             | 89.00           | 150.03      | 6,902.00              | -9,644.40    | 2,904.32     | 14,447,541.22       | 1,729,446.08       | 39.78208600 | -80.68310100 |

PBHL/TD 15640.08 MD/6902.00 TVD

WV Department of Environmental Protection

| Design Targets  |               |              |            |              |              |                 |                |             |              |
|---|---------------|--------------|------------|--------------|--------------|-----------------|----------------|-------------|--------------|
| Target Name   | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude    | Longitude    |
| Heaven Hill 3-1 HM LP r<br>- plan hits target center<br>- Point | 0.00          | 0.01         | 6,769.00   | -3,046.39    | -900.66      | 14,454,139.23   | 1,725,641.10   | 39.80024200 | -80.69656500 |
| Heaven Hill 3-1 HM BHL<br>- plan hits target center<br>- Point  | 0.00          | 0.01         | 6,902.00   | -9,644.40    | 2,904.32     | 14,447,541.22   | 1,729,446.08   | 39.78208600 | -80.68310100 |

| Casing Points         |                       |                           |                     |                   |  |
|-----------------------|-----------------------|---------------------------|---------------------|-------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Name                      | Casing Diameter (") | Hole Diameter (") |  |
| 120.00                | 120.00                | 30" Casing @ 120 TVD      | 30                  | 36                |  |
| 1,090.00              | 1,090.00              | 13 3/8" Casing @ 1090 TVD | 13-3/8              | 17                |  |
| 2,805.48              | 2,800.00              | 9 5/8" Casing @ 2800 TVD  | 9-5/8               | 12-1/4            |  |

| Plan Annotations      |                       |              |              |                                 |  |
|-----------------------|-----------------------|--------------|--------------|---------------------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Comment                         |  |
| 1,200.00              | 1,200.00              | 0.00         | 0.00         | KOP Begin 2°/100' build         |  |
| 1,450.00              | 1,449.68              | -10.24       | -3.73        | Begin 5.00° tangent             |  |
| 2,905.86              | 2,900.00              | -129.48      | -47.13       | Begin 3°/100' build             |  |
| 4,072.52              | 3,961.18              | -542.52      | -197.46      | Begin 40.00° tangent            |  |
| 6,172.52              | 5,569.87              | -1,810.97    | -659.14      | Begin 3°/100' turn              |  |
| 6,302.24              | 5,669.30              | -1,887.61    | -691.71      | Begin 39.98° tangent            |  |
| 7,340.87              | 6,485.29              | -2,487.12    | -984.66      | Begin 10°/100' build/turn       |  |
| 8,022.38              | 6,769.00              | -3,046.39    | -900.66      | Begin 89.00° lateral section    |  |
| 15,640.08             | 6,902.00              | -9,644.40    | 2,904.32     | PBHL/TD 15640.08 MD/6902.00 TVD |  |





# Well Site Safety Plan

## Tug Hill Operating, LLC

*JL*  
*2/5/18*

Well Name: Heaven Hill 3-1HM

Pad Location: Heaven Hill 3

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:  
Northing-4,406,558.99  
Easting -526,250.98

February 2018

RECEIVED  
Office of Oil and Gas

FEB 6 2018

WV Department of  
Environmental Protection

WW-6A1  
(5/13)

Operator's Well No. Heaven Hill Unit 3-1HM

**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        |                       |                       |         | RECEIVED<br>Office of Oil and Gas<br><br>FEB 6 2018<br><br>WV Department of<br>Environmental Protection |

**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: Jonathan White  
 Its: Regulatory Analyst - Appalachia Region

| Lease Name or No. | Tag | Parcel   | Grantor, Lessor, etc.                             | Grantee, Lessee, etc.      | Royalty | seed Book/Pa | 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                     | Chevron to Tug Hill: 36/148    |
| 10*15557          | B   | 9-7-21   | RICKY L WHITLATCH ET AL                           | CHEVRON USA INC            | 1/8+    | 830 351      | 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+    | 900 363      | N/A                      | N/A                     | Chevron to Tug Hill: 36/148    |
| 10*15698          | C   | 9-7-18   | ROBERT A EDGE AND SHERIE N EDGE                   | TH EXPLORATION LLC         | 1/8+    | 905 458      | N/A                      | N/A                     | N/A                            |
| 10*15720          | C   | 9-7-18   | KAREN L GREATHOUSE AND FLOYD GREATHOUSE           | TH EXPLORATION LLC         | 1/8+    | 905 456      | N/A                      | N/A                     | N/A                            |
| 10*15721          | C   | 9-7-18   | TINA L EDGE MONTI AND THOMAS MONTI                | TH EXPLORATION LLC         | 1/8+    | 905 464      | N/A                      | N/A                     | N/A                            |
| 10*16020          | C   | 9-7-18   | SHARON HINERMAN MAY & DANIEL G MAY                | TH EXPLORATION LLC         | 1/8+    | 905 460      | N/A                      | N/A                     | N/A                            |
| 10*16028          | C   | 9-7-18   | ROSEMARY PARKINS AND STEPHEN PARKINS              | TH EXPLORATION LLC         | 1/8+    | 905 462      | N/A                      | N/A                     | N/A                            |
| 10*16051          | C   | 9-7-18   | DONNA JEAN SNIDER AND DAVID SNIDER                | TH EXPLORATION LLC         | 1/8+    | 905 466      | N/A                      | N/A                     | N/A                            |
| 10*16053          | C   | 9-7-18   | GARY D HINERMAN AND JUDY ANN HINERMAN             | TH EXPLORATION LLC         | 1/8+    | 905 468      | N/A                      | N/A                     | N/A                            |
| 10*16289          | C   | 9-7-18   | BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON | TH EXPLORATION LLC         | 1/8+    | 905 452      | N/A                      | N/A                     | N/A                            |
| 10*16412          | C   | 9-7-18   | ELIZABETH ANN BLAZER AND PAUL R BLAZER            | TH EXPLORATION LLC         | 1/8+    | 905 454      | 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                            |
| 10*15667          | D   | 9-7-20   | KEVIN E MCGILTON ET UX                            | CHEVRON USA INC            | 1/8+    | 850 351      | N/A                      | N/A                     | Chevron to Tug Hill: 36/148    |
| 10*15698          | D   | 9-7-20   | ROBERT A EDGE AND SHERIE N EDGE                   | TH EXPLORATION LLC         | 1/8+    | 900 363      | 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                            |
| 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                            |
| 10*16020          | D   | 9-7-20   | SHARON HINERMAN MAY & DANIEL G MAY                | TH EXPLORATION LLC         | 1/8+    | 905 460      | 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                            |
| 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                            |
| 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                            |
| 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                            |
| 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                            |
| 10*16413          | D   | 9-7-20   | RONALD H EDGE JR                                  | TH EXPLORATION LLC         | 1/8+    | 905 454      | 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                     | 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                            |
| 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                            |
| 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                            |
| 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                            |
| 10*15560          | G   | 9-11-6.2 | GLEN A BONAR                                      | TH EXPLORATION LLC         | 1/8+    | 881 151      | N/A                      | N/A                     | N/A                            |
| 10*47051.256.2    | G   | 9-11-6.2 | WILLIAM F KERNS ET UX                             | CHESSAPEAKE APPALACHIA LLC | 1/8+    | 677 561      | N/A                      | N/A                     | Chevsapeake to Chevron: 30/461 |
| 10*47051.256.3    | G   | 9-11-6.2 | CAROL JEAN ANDERSON                               | TH EXPLORATION LLC         | 1/8+    | 879 299      | N/A                      | N/A                     | N/A                            |
| 10*47051.256.4    | G   | 9-11-6.2 | BRENDA S DYKHOUSE                                 | TH EXPLORATION LLC         | 1/8+    | 881 148      | N/A                      | N/A                     | N/A                            |
| 10*47051.256.1    | H   | 9-11-6   | BRENDA J WHETZEL                                  | TH EXPLORATION LLC         | 1/8+    | 881 145      | N/A                      | N/A                     | N/A                            |
| 10*47051.256.2    | H   | 9-11-6   | CAROL JEAN ANDERSON                               | TH EXPLORATION LLC         | 1/8+    | 879 299      | N/A                      | N/A                     | N/A                            |
| 10*47051.256.3    | H   | 9-11-6   | BRENDA S DYKHOUSE                                 | TH EXPLORATION LLC         | 1/8+    | 881 148      | N/A                      | N/A                     | N/A                            |
| 10*47051.256.4    | H   | 9-11-6   | GLEN A BONAR                                      | TH EXPLORATION LLC         | 1/8+    | 881 151      | N/A                      | N/A                     | N/A                            |
| 10*47051.108.1    | I   | 9-11-9   | MICHAEL A WHETZEL                                 | TH EXPLORATION LLC         | 1/8+    | 885 51       | N/A                      | N/A                     | N/A                            |
| 10*15882          | J   | 9-11-30  | ROBERT L CLARK                                    | CHESSAPEAKE APPALACHIA LLC | 1/8+    | 685 239      | N/A                      | N/A                     | Chevsapeake to Chevron: 30/461 |
| 10*15559          | K   | 9-11-31  | KENNETH M MCCARDLE ET UX REV LT                   | CHEVRON USA INC            | 1/8+    | 816 499      | N/A                      | N/A                     | N/A                            |
| 10*15510          | L   | 9-11-12  | ELAINE PHELPS ET VIR                              | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 326      | NPAR to Chevron: 24/430  | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15511          | L   | 9-11-12  | DAVID E CROW                                      | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 376      | NPAR to Chevron: 26/269  | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15512          | L   | 9-11-12  | FRANCES COFFEY                                    | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 378      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15513          | L   | 9-11-12  | KAY KERES   | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 330      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15514          | L   | 9-11-12  | L PAUL CROW                                       | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 336      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15515          | L   | 9-11-12  | DESIRE L CROW                                     | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 334      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15516          | L   | 9-11-12  | ROSE MARIE KIELGECZEWSKI                          | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 354      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15517          | L   | 9-11-12  | DIANNE GELLNER & GARY GELLNER                     | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 345      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15518          | L   | 9-11-12  | JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY          | TRIENERGY HOLDINGS LLC     | 1/8+    | 718 347      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15519          | L   | 9-11-12  | JOHN CROW   | TRIENERGY HOLDINGS LLC     | 1/8+    | 726 580      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |
| 10*15520          | L   | 9-11-12  | TIMOTHY CROW                                      | TRIENERGY HOLDINGS LLC     | 1/8+    | 726 582      | NPAR to Chevron: 756/332 | NPAR to Chevron: 30/461 | Chevron to Tug Hill: 36/148    |

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WV Department of Environmental Protection

| Lease Name or No. | Tag | Parcel  | Grantor, Lessor, etc.                            | Grantee, Lessee, etc. | Royalty | Seed Book/Pg. | Assignment | Assignment |
|-------------------|-----|---------|--|-----------------------|---------|---------------|------------|------------|
| 10*47051.123.1    | L   | 9-11-12 | LLOYD G BAKER                                    | TH EXPLORATION LLC    | 1/8+    | 865 389       | N/A        | N/A        |
| 10*47051.123.2    | L   | 9-11-12 | JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY         | TH EXPLORATION LLC    | 1/8+    | 873 143       | N/A        | N/A        |
| 10*15458          | M   | 9-14-16 | JOANN MERCER                                     | TH EXPLORATION LLC    | 1/8+    | 921 273       | N/A        | N/A        |
| 10*15469          | M   | 9-14-16 | HARRIET J ANDERSON                               | TH EXPLORATION LLC    | 1/8+    | 920 11        | N/A        | N/A        |
| 10*15470          | M   | 9-14-16 | BETTY L LOGES                                    | TH EXPLORATION LLC    | 1/8+    | 921 286       | N/A        | N/A        |
| 10*15472          | M   | 9-14-16 | DONALD & SANDRA GRIZEL                           | TH EXPLORATION LLC    | 1/8+    | 920 70        | N/A        | N/A        |
| 10*15473          | M   | 9-14-16 | WILLIAM F MCDONALD AND SHIRLEY MCDONALD          | TH EXPLORATION LLC    | 1/8+    | 921 198       | N/A        | N/A        |
| 10*15476          | M   | 9-14-16 | CURRITS W WEST JR AND DIANE WEST                 | TH EXPLORATION LLC    | 1/8+    | 921 263       | N/A        | N/A        |
| 10*15488          | M   | 9-14-16 | MANCF F PFE & STEPHEN M PFE                      | TH EXPLORATION LLC    | 1/8+    | 921 226       | N/A        | N/A        |
| 10*15495          | M   | 9-14-16 | WALTER LEE BARNHART AND BARBARA L HEATH          | TH EXPLORATION LLC    | 1/8+    | 921 222       | N/A        | N/A        |
| 10*15694          | M   | 9-14-16 | DEBORAH L MERCER                                 | TH EXPLORATION LLC    | 1/8+    | 921 271       | N/A        | N/A        |
| 10*15695          | M   | 9-14-16 | JOHN R AND LOIS L GORBY                          | TH EXPLORATION LLC    | 1/8+    | 929 259       | N/A        | N/A        |
| 10*15696          | M   | 9-14-16 | JOSEPH JEREMY PALMER                             | TH EXPLORATION LLC    | 1/8+    | 921 275       | N/A        | N/A        |
| 10*15741          | M   | 9-14-16 | LOHRN S GORBY                                    | TH EXPLORATION LLC    | 1/8+    | 929 641       | N/A        | N/A        |
| 10*16152          | M   | 9-14-16 | CONNIE HECKLE                                    | TH EXPLORATION LLC    | 1/8+    | 920 29        | N/A        | N/A        |
| 10*16153          | M   | 9-14-16 | LARRY JACK EMERY                                 | TH EXPLORATION LLC    | 1/8+    | 920 13        | N/A        | N/A        |
| 10*16186          | M   | 9-14-16 | DEBORAH KAY COOLEY AND ROBERT T BECK             | TH EXPLORATION LLC    | 1/8+    | 920 65        | N/A        | N/A        |
| 10*16187          | M   | 9-14-16 | PATRICIA D BABL AND JOHN J BABL                  | TH EXPLORATION LLC    | 1/8+    | 920 31        | N/A        | N/A        |
| 10*16191          | M   | 9-14-16 | MADELYN E MOSSOR                                 | TH EXPLORATION LLC    | 1/8+    | 920 76        | N/A        | N/A        |
| 10*16403          | M   | 9-14-16 | WILLIAM C EDGAR AND CHRISTY E EDGAR              | TH EXPLORATION LLC    | 1/8+    | 920 61        | N/A        | N/A        |
| 10*16404          | M   | 9-14-16 | KATHRYN M WHIPKEY                                | TH EXPLORATION LLC    | 1/8+    | 921 194       | N/A        | N/A        |
| 10*16406          | M   | 9-14-16 | ARLENA B HORNER AND QUAY ALLEN HORNER            | TH EXPLORATION LLC    | 1/8+    | 921 240       | N/A        | N/A        |
| 10*16407          | M   | 9-14-16 | JANICE F BROOKOVER                               | TH EXPLORATION LLC    | 1/8+    | 920 74        | N/A        | N/A        |
| 10*16408          | M   | 9-14-16 | KATHLEEN I FRANCES                               | TH EXPLORATION LLC    | 1/8+    | 921 196       | N/A        | N/A        |
| 10*16409          | M   | 9-14-16 | JEANETTE M HEATH                                 | TH EXPLORATION LLC    | 1/8+    | 920 72        | N/A        | N/A        |
| 10*16425          | M   | 9-14-16 | WILLIAM A MASON JR AND ROBIN MASON               | TH EXPLORATION LLC    | 1/8+    | 920 25        | N/A        | N/A        |
| 10*16428          | M   | 9-14-16 | BRUCE LYNN JOHNSON AND KIMBERLY A JOHNSON        | TH EXPLORATION LLC    | 1/8+    | 920 50        | N/A        | N/A        |
| 10*16438          | M   | 9-14-16 | ALICE MARLENE PERSINGER                          | TH EXPLORATION LLC    | 1/8+    | 921 236       | N/A        | N/A        |
| 10*16468          | M   | 9-14-16 | LARRY W JOHNSON                                  | TH EXPLORATION LLC    | 1/8+    | 920 57        | N/A        | N/A        |
| 10*16469          | M   | 9-14-16 | JAMES EARL AND MARGARET L SIBURT                 | TH EXPLORATION LLC    | 1/8+    | 921 245       | N/A        | N/A        |
| 10*16470          | M   | 9-14-16 | CAROLYN SUE FRANKLIN AND RAYMOND EUGENE FRANKLIN | TH EXPLORATION LLC    | 1/8+    | 921 219       | N/A        | N/A        |
| 10*16472          | M   | 9-14-16 | JUDY DELORES SIBURT                              | TH EXPLORATION LLC    | 1/8+    | 929 643       | N/A        | N/A        |
| 10*16473          | M   | 9-14-16 | LUNDA ELAINE AND RICHARD LEROY LITTELL           | TH EXPLORATION LLC    | 1/8+    | 929 256       | N/A        | N/A        |
| 10*16474          | M   | 9-14-16 | BARBARA KAY SIBURT                               | TH EXPLORATION LLC    | 1/8+    | 921 266       | N/A        | N/A        |
| 10*16475          | M   | 9-14-16 | MARY LOUISE GORBY                                | TH EXPLORATION LLC    | 1/8+    | 921 234       | N/A        | N/A        |
| 10*16476          | M   | 9-14-16 | ROGER ALLAN AND CYNTHIA L JOHNSON                | TH EXPLORATION LLC    | 1/8+    | 921 257       | N/A        | N/A        |
| 10*16477          | M   | 9-14-16 | BRENDA K YOHO                                    | TH EXPLORATION LLC    | 1/8+    | 921 228       | N/A        | N/A        |
| 10*16550          | M   | 9-14-16 | CHARLES LEROY AND MARTHA G LEACH                 | TH EXPLORATION LLC    | 1/8+    | 920 19        | N/A        | N/A        |
| 10*16551          | M   | 9-14-16 | JACK L JR & VIRGINIA L CROW                      | TH EXPLORATION LLC    | 1/8+    | 921 260       | N/A        | N/A        |
| 10*16867          | M   | 9-14-16 | APRIL M WEED                                     | TH EXPLORATION LLC    | 1/8+    | 921 279       | N/A        | N/A        |
| 10*16883          | M   | 9-14-16 | VICKIE LYNN PAPE AND JOHN EDWARD PAPE            | TH EXPLORATION LLC    | 1/8+    | 921 248       | N/A        | N/A        |
| 10*16884          | M   | 9-14-16 | DELORES A AND LEONARD B BOWERS                   | TH EXPLORATION LLC    | 1/8+    | 921 281       | N/A        | N/A        |
| 10*16916          | M   | 9-14-16 | ROGER LEE WEST                                   | TH EXPLORATION LLC    | 1/8+    | 921 277       | N/A        | N/A        |
| 10*16971          | M   | 9-14-16 | LEONA W SIBURT                                   | TH EXPLORATION LLC    | 1/8+    | 921 238       | N/A        | N/A        |
| 10*16972          | M   | 9-14-16 | SCOTT BRADLEY AND SHERRY ANN GRIMM               | TH EXPLORATION LLC    | 1/8+    | 921 242       | N/A        | N/A        |
| 10*16973          | M   | 9-14-16 | NANCY C AND CARL E KESSELING                     | TH EXPLORATION LLC    | 1/8+    | 920 22        | N/A        | N/A        |
| 10*17358          | M   | 9-14-16 | KAREN LOUISE AND ROGER L DUNHAM                  | TH EXPLORATION LLC    | 1/8+    | 921 254       | N/A        | N/A        |
| 10*17359          | M   | 9-14-16 | TH EXPLORATION LLC                               | TH EXPLORATION LLC    | 1/8+    | 921 224       | N/A        | N/A        |
| 10*17361          | M   | 9-14-16 | SHEILA RAMONA CROW                               | TH EXPLORATION LLC    | 1/8+    | 920 78        | N/A        | N/A        |
| 10*17362          | M   | 9-14-16 | NILA VIRGINIA AND FREDERICK EUGENE STREIGHT      | TH EXPLORATION LLC    | 1/8+    | 921 251       | N/A        | N/A        |
| 10*17366          | M   | 9-14-16 | SYLVIA DEE WOOD                                  | TH EXPLORATION LLC    | 1/8+    | 921 230       | N/A        | N/A        |
| 10*17367          | M   | 9-14-16 | JERRY HOWELL                                     | TH EXPLORATION LLC    | 1/8+    | 920 37        | N/A        | N/A        |
| 10*17368          | M   | 9-14-16 | DONALD PAUL CROW AND CRYSTAL LYNN CROW           | TH EXPLORATION LLC    | 1/8+    | 921 201       | N/A        | N/A        |
| 10*17369          | M   | 9-14-16 | DELORES A WALLACE                                | TH EXPLORATION LLC    | 1/8+    | 920 63        | N/A        | N/A        |

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| Lease Name or No. | Tag | Parcel  | Grantor, Lessor, etc.   | Grantee, Lessee, etc. | Royalty | 3rd Party | Assignment | Assignment |
|-------------------|-----|---------|---|-----------------------|---------|-----------|------------|------------|
| 10*17371          | M   | 9-14-16 | MACK A AND CAROL A CROW   | TH EXPLORATION LLC    | 1/8+    | 921 204   | N/A        | N/A        |
| 10*17372          | M   | 9-14-16 | DONNIE JASON HEDGEPEETH AND KAREN L HEDGEPEETH                                    | TH EXPLORATION LLC    | 1/8+    | 920 42    | N/A        | N/A        |
| 10*17373          | M   | 9-14-16 | NILA F HEDGEPEETH   | TH EXPLORATION LLC    | 1/8+    | 920 25    | N/A        | N/A        |
| 10*17374          | M   | 9-14-16 | EZRA HOWARD COCHRAN   | TH EXPLORATION LLC    | 1/8+    | 920 27    | N/A        | N/A        |
| 10*17380          | M   | 9-14-16 | DEBORAH IRENE PIERCE AND BARRETT LEE PIERCE                                       | TH EXPLORATION LLC    | 1/8+    | 920 34    | N/A        | N/A        |
| 10*17381          | M   | 9-14-16 | CINDY J AND DARNELL L FULKS   | TH EXPLORATION LLC    | 1/8+    | 921 268   | N/A        | N/A        |
| 10*17382          | M   | 9-14-16 | HELEN MARIE AND DAVID E MCCRAY  | TH EXPLORATION LLC    | 1/8+    | 920 147   | N/A        | N/A        |
| 10*17389          | M   | 9-14-16 | MELOBA EILEEN HUDDLESTUN  | TH EXPLORATION LLC    | 1/8+    | 920 53    | N/A        | N/A        |
| 10*17390          | M   | 9-14-16 | HAROLD B CROW AND CONNIE SUE CROW   | TH EXPLORATION LLC    | 1/8+    | 921 207   | N/A        | N/A        |
| 10*17391          | M   | 9-14-16 | BETTY L HUFF AND OLLIE C HUGGINS  | TH EXPLORATION LLC    | 1/8+    | 921 210   | N/A        | N/A        |
| 10*17392          | M   | 9-14-16 | BEVERLY KATHRYN GODDARD   | TH EXPLORATION LLC    | 1/8+    | 920 55    | N/A        | N/A        |
| 10*17393          | M   | 9-14-16 | CHARLE M TURNER AND BESSIE M TURNER   | TH EXPLORATION LLC    | 1/8+    | 920 39    | N/A        | N/A        |
| 10*17394          | M   | 9-14-16 | JUDY LOUISE GLOVER  | TH EXPLORATION LLC    | 1/8+    | 921 232   | N/A        | N/A        |
| 10*17397          | M   | 9-14-16 | PAT DARELL TURNER AND TINA DENISE TURNER  | TH EXPLORATION LLC    | 1/8+    | 925 117   | N/A        | N/A        |
| 10*17399          | M   | 9-14-16 | RONALD EDWARD WATSON AND DIANA L WATSON   | TH EXPLORATION LLC    | 1/8+    | 925 120   | N/A        | N/A        |
| 10*17401          | M   | 9-14-16 | JOHN M HAUGHT JR AND CHERYL A HAUGHT  | TH EXPLORATION LLC    | 1/8+    | 925 182   | N/A        | N/A        |
| 10*17402          | M   | 9-14-16 | DIANA LYNN BUMGARDNER   | TH EXPLORATION LLC    | 1/8+    | 920 68    | N/A        | N/A        |
| 10*17403          | M   | 9-14-16 | JAMES B AND PENNY G CROW  | TH EXPLORATION LLC    | 1/8+    | 925 187   | N/A        | N/A        |
| 10*17404          | M   | 9-14-16 | BRIAN K CROW  | TH EXPLORATION LLC    | 1/8+    | 925 185   | N/A        | N/A        |
| 10*17405          | M   | 9-14-16 | ORVELLA L AND LARRY L NEFF  | TH EXPLORATION LLC    | 1/8+    | 925 114   | N/A        | N/A        |
| 10*17408          | M   | 9-14-16 | WILLIAM JAMES HEDGEPEETH AND ERIN ELIZABETH HEDGEPEETH                            | TH EXPLORATION LLC    | 1/8+    | 924 572   | N/A        | N/A        |
| 10*17409          | M   | 9-14-16 | JUDY A AND CLYDE E ELZETZ   | TH EXPLORATION LLC    | 1/8+    | 924 569   | N/A        | N/A        |
| 10*17410          | M   | 9-14-16 | LILLIE L GAREY  | TH EXPLORATION LLC    | 1/8+    | 924 567   | N/A        | N/A        |
| 10*17420          | M   | 9-14-16 | DAVID LEE AND ANN F BAKER   | TH EXPLORATION LLC    | 1/8+    | 924 564   | N/A        | N/A        |
| 10*17490          | M   | 9-14-16 | CONNIE SUE DOUGLAS AND RONNIE J DOUGLAS   | TH EXPLORATION LLC    | 1/8+    | 924 578   | N/A        | N/A        |
| 10*17491          | M   | 9-14-16 | THOMAS LEE AND CLARA J HAUGHT   | TH EXPLORATION LLC    | 1/8+    | 924 575   | N/A        | N/A        |
| 10*17598          | M   | 9-14-16 | TERRY LEE PETTIT AND STEPHANIE LYNN PETTIT  | TH EXPLORATION LLC    | 1/8+    | 921 288   | N/A        | N/A        |
| 10*17710          | M   | 9-14-16 | DEBRA J & DARELL R LANCASTER  | TH EXPLORATION LLC    | 1/8+    | 929 634   | N/A        | N/A        |
| 10*17811          | M   | 9-14-16 | PANSY M ASTON AND ELMER L ASTON   | TH EXPLORATION LLC    | 1/8+    | 921 216   | N/A        | N/A        |
| 10*17821          | M   | 9-14-16 | GREGORY S CROW  | TH EXPLORATION LLC    | 1/8+    | 929 639   | N/A        | N/A        |
| 10*17902          | M   | 9-14-16 | SUSAN LYNN SEDGEMER   | TH EXPLORATION LLC    | 1/8+    | 920 59    | N/A        | N/A        |
| 10*17904          | M   | 9-14-16 | RICKY LEE AND TAMMY J WATSON  | TH EXPLORATION LLC    | 1/8+    | 921 213   | N/A        | N/A        |
| 10*17958          | M   | 9-14-16 | SANDRA KAY RICHMOND   | TH EXPLORATION LLC    | 1/8+    | 929 632   | N/A        | N/A        |
| 10*17929          | N   | 9-14-17 | STONE HILL MINERALS HOLDINGS LLC  | TH EXPLORATION LLC    | 1/8+    | 921 320   | N/A        | N/A        |
| 10*15477          | O   | 9-14-18 | RONALD A WYCINSKI   | TH EXPLORATION LLC    | 1/8+    | 906 241   | N/A        | N/A        |
| 10*15730          | O   | 9-14-18 | FRANCES V CARPENTER   | TH EXPLORATION LLC    | 1/8+    | 906 256   | N/A        | N/A        |
| 10*15752          | O   | 9-14-18 | KIM O CHAMBERS AND DEBRA CHAMBERS   | TH EXPLORATION LLC    | 1/8+    | 906 258   | N/A        | N/A        |
| 10*16017          | O   | 9-14-18 | FLOYD A MCFADDEN  | TH EXPLORATION LLC    | 1/8+    | 906 260   | N/A        | N/A        |
| 10*16018          | O   | 9-14-18 | BARBARA MCFADDEN ALBRIGHT   | TH EXPLORATION LLC    | 1/8+    | 906 262   | N/A        | N/A        |
| 10*16030          | O   | 9-14-18 | JOSEPH F CHMIELEWSKI AND SANDRA CHMIELEWSKI                                       | TH EXPLORATION LLC    | 1/8+    | 906 264   | N/A        | N/A        |
| 10*16031          | O   | 9-14-18 | CARL J CHMIELEWSKI AND KATHLEEN A CHMIELEWSKI                                     | TH EXPLORATION LLC    | 1/8+    | 906 266   | N/A        | N/A        |
| 10*16083          | O   | 9-14-18 | CECIL HARRY LILLY, III AND PAMELA KAY KNIGHT LILLY                                | TH EXPLORATION LLC    | 1/8+    | 912 47    | N/A        | N/A        |
| 10*16085          | O   | 9-14-18 | KATHARIN ANNETTE LILLY LAING AND FREDIE JOE LAING                                 | TH EXPLORATION LLC    | 1/8+    | 912 45    | N/A        | N/A        |
| 10*16086          | O   | 9-14-18 | KATHARIN DAY LILLY  | TH EXPLORATION LLC    | 1/8+    | 906 272   | N/A        | N/A        |
| 10*16087          | O   | 9-14-18 | MARY PENELOPE LILLY MURPHY  | TH EXPLORATION LLC    | 1/8+    | 912 41    | N/A        | N/A        |
| 10*16131          | O   | 9-14-18 | ERIC S DOBBS  | TH EXPLORATION LLC    | 1/8+    | 902 68    | N/A        | N/A        |
| 10*16144          | O   | 9-14-18 | PATTIE S MADRID   | TH EXPLORATION LLC    | 1/8+    | 906 278   | N/A        | N/A        |
| 10*16180          | O   | 9-14-18 | LARRY L CHAMBERS  | TH EXPLORATION LLC    | 1/8+    | 906 280   | N/A        | N/A        |
| 10*16181          | O   | 9-14-18 | NORMA CHRISTINE WHIPP AND GERALD WAYNE BLACK                                      | TH EXPLORATION LLC    | 1/8+    | 906 281   | N/A        | N/A        |
| 10*16182          | O   | 9-14-18 | FIRST CHRISTIAN CHURCH OF MOUNDSVILLE BY ROGER FRANCIS AND ROBERT ALBERT TRUSTEES | TH EXPLORATION LLC    | 1/8+    | 906 283   | N/A        | N/A        |
| 10*16183          | O   | 9-14-18 | ALLEN R L DAVIS AND DIANA LEE PATTERSON   | TH EXPLORATION LLC    | 1/8+    | 906 285   | N/A        | N/A        |
| 10*16239          | O   | 9-14-18 | ANGELA L OLDFIELD AND KENNETH W OLDFIELD  | TH EXPLORATION LLC    | 1/8+    | 906 287   | N/A        | N/A        |
| 10*16240          | O   | 9-14-18 | BONNIE SUE PATTERSON SMISHER  | TH EXPLORATION LLC    | 1/8+    | 906 289   | N/A        | N/A        |
| 10*16285          | O   | 9-14-18 | JOHN A SHUTZ AND CYNTHIA J SHUTZ  | TH EXPLORATION LLC    | 1/8+    | 906 291   | N/A        | N/A        |

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|-------------------|-----|---------|--|-----------------------|---------|---------------|------------|------------|
| 10*16441          | 0   | 9-14-18 | GEORGE FRANKLIN AND NANCY ANN REED               | TH EXPLORATION LLC    | 1/8+    | 924 619       | N/A        | N/A        |
| 10*16442          | 0   | 9-14-18 | FRED T AND JERRY L CHAMBERS                      | TH EXPLORATION LLC    | 1/8+    | 924 174       | N/A        | N/A        |
| 10*16443          | 0   | 9-14-18 | BARBARA BROWN CHAMBERS                           | TH EXPLORATION LLC    | 1/8+    | 924 621       | N/A        | N/A        |
| 10*16444          | 0   | 9-14-18 | CATHERINE ELLEN CHAMBERS                         | TH EXPLORATION LLC    | 1/8+    | 924 623       | N/A        | N/A        |
| 10*16445          | 0   | 9-14-18 | DOUGLAS C AND GWENDLYN D LEWTON                  | TH EXPLORATION LLC    | 1/8+    | 925 123       | N/A        | N/A        |
| 10*16483          | 0   | 9-14-18 | JOHN C AND BARBARA H WINTER                      | TH EXPLORATION LLC    | 1/8+    | 924 178       | N/A        | N/A        |
| 10*16486          | 0   | 9-14-18 | DAVID ALAN WILKINSON AND PATRICIA LYNN WILKINSON | TH EXPLORATION LLC    | 1/8+    | 924 180       | N/A        | N/A        |
| 10*16490          | 0   | 9-14-18 | WILLIAM H AND MERRY C COTTON                     | TH EXPLORATION LLC    | 1/8+    | 924 176       | N/A        | N/A        |
| 10*16498          | 0   | 9-14-18 | SHELLY YEATER                                    | TH EXPLORATION LLC    | 1/8+    | 925 283       | N/A        | N/A        |
| 10*16511          | 0   | 9-14-18 | DOUGLAS R BOWEN                                  | TH EXPLORATION LLC    | 1/8+    | 906 475       | N/A        | N/A        |
| 10*16531          | 0   | 9-14-18 | KATHY DOBBS WELLS                                | TH EXPLORATION LLC    | 1/8+    | 906 472       | N/A        | N/A        |
| 10*16532          | 0   | 9-14-18 | JEAN ANN MCFADDEN                                | TH EXPLORATION LLC    | 1/8+    | 906 459       | N/A        | N/A        |
| 10*16533          | 0   | 9-14-18 | SHIRLEY ANN DOBBS                                | TH EXPLORATION LLC    | 1/8+    | 906 469       | N/A        | N/A        |
| 10*16534          | 0   | 9-14-18 | TERRY LEE LASAVAGE                               | TH EXPLORATION LLC    | 1/8+    | 906 443       | N/A        | N/A        |
| 10*16535          | 0   | 9-14-18 | CHARLES E CARSON AND MARY KAY CARSON             | TH EXPLORATION LLC    | 1/8+    | 906 420       | N/A        | N/A        |
| 10*16537          | 0   | 9-14-18 | KIM D BOWEN AND MADONNA M BOWEN                  | TH EXPLORATION LLC    | 1/8+    | 907 415       | N/A        | N/A        |
| 10*16540          | 0   | 9-14-18 | JAMES A WINTER AND CONNIE G WINTER               | TH EXPLORATION LLC    | 1/8+    | 924 184       | N/A        | N/A        |
| 10*16569          | 0   | 9-14-18 | JANICE C BALE                                    | TH EXPLORATION LLC    | 1/8+    | 907 425       | N/A        | N/A        |
| 10*16570          | 0   | 9-14-18 | ROBERT D BOWEN AND MARGA M R BOWEN               | TH EXPLORATION LLC    | 1/8+    | 907 420       | N/A        | N/A        |
| 10*16576          | 0   | 9-14-18 | LINDA A MINER AND MICHAEL W MINER                | TH EXPLORATION LLC    | 1/8+    | 907 484       | N/A        | N/A        |
| 10*16580          | 0   | 9-14-18 | HAROLD C MCFADDEN                                | TH EXPLORATION LLC    | 1/8+    | 907 480       | N/A        | N/A        |
| 10*16581          | 0   | 9-14-18 | HELEN L SCHILLING                                | TH EXPLORATION LLC    | 1/8+    | 907 489       | N/A        | N/A        |
| 10*16582          | 0   | 9-14-18 | DORA BROCK BRAMMER                               | TH EXPLORATION LLC    | 1/8+    | 907 429       | N/A        | N/A        |
| 10*16680          | 0   | 9-14-18 | RONALD J AND JENNIFER CHAMBERS FICCA             | TH EXPLORATION LLC    | 1/8+    | 924 186       | N/A        | N/A        |
| 10*16726          | 0   | 9-14-18 | LESLY K WHITE                                    | TH EXPLORATION LLC    | 1/8+    | 924 182       | N/A        | N/A        |
| 10*16733          | 0   | 9-14-18 | SARAH L BISHOP                                   | TH EXPLORATION LLC    | 1/8+    | 924 172       | N/A        | N/A        |
| 10*16835          | 0   | 9-14-18 | ERNEST CARL AUGUSTINE JR                         | TH EXPLORATION LLC    | 1/8+    | 924 188       | N/A        | N/A        |
| 10*16882          | 0   | 9-14-18 | JAMES LEROY AND DARLENE DOBBS OWENS              | TH EXPLORATION LLC    | 1/8+    | 924 190       | N/A        | N/A        |
| 10*16949          | 0   | 9-14-18 | FREDERICK M LEWTON                               | TH EXPLORATION LLC    | 1/8+    | 924 136       | N/A        | N/A        |
| 10*16950          | 0   | 9-14-18 | STEVEN R AND BRIANNE L UTT                       | TH EXPLORATION LLC    | 1/8+    | 924 138       | N/A        | N/A        |
| 10*16952          | 0   | 9-14-18 | JAY E AND CECILIA E LEWTON                       | TH EXPLORATION LLC    | 1/8+    | 924 134       | N/A        | N/A        |
| 10*16953          | 0   | 9-14-18 | RUSSELL D HERVEY                                 | TH EXPLORATION LLC    | 1/8+    | 924 132       | N/A        | N/A        |
| 10*16965          | 0   | 9-14-18 | DONALD T AND JEAN K HOGAN                        | TH EXPLORATION LLC    | 1/8+    | 924 140       | N/A        | N/A        |
| 10*16966          | 0   | 9-14-18 | WILLIAM L WRIGHT AND CAROLINA WRIGHT             | TH EXPLORATION LLC    | 1/8+    | 914 524       | N/A        | N/A        |
| 10*16967          | 0   | 9-14-18 | JOHN GILLETTE AND BARBARA GILLETTE               | TH EXPLORATION LLC    | 1/8+    | 913 377       | N/A        | N/A        |
| 10*16990          | 0   | 9-14-18 | TARA JEANNE MINOR AND JENNIFER A KNAPP           | TH EXPLORATION LLC    | 1/8+    | 914 612       | N/A        | N/A        |
| 10*16992          | 0   | 9-14-18 | ROSEMARY H BEAVERS                               | TH EXPLORATION LLC    | 1/8+    | 924 152       | N/A        | N/A        |
| 10*16993          | 0   | 9-14-18 | LINDA C ABRAHAM                                  | TH EXPLORATION LLC    | 1/8+    | 924 148       | N/A        | N/A        |
| 10*16995          | 0   | 9-14-18 | JULIA HOOVER                                     | TH EXPLORATION LLC    | 1/8+    | 924 150       | N/A        | N/A        |
| 10*17129          | 0   | 9-14-18 | DIANE ELISE RAMSEY                               | TH EXPLORATION LLC    | 1/8+    | 924 146       | N/A        | N/A        |
| 10*17131          | 0   | 9-14-18 | ROBERTA JANE PARKINSON                           | TH EXPLORATION LLC    | 1/8+    | 924 142       | N/A        | N/A        |
| 10*17134          | 0   | 9-14-18 | LAURA E TOTTEN AND LONNIE R TOTTEN               | TH EXPLORATION LLC    | 1/8+    | 924 154       | N/A        | N/A        |
| 10*17139          | 0   | 9-14-18 | UNITED CHRISTIAN MISSIONARY SOCIETY              | TH EXPLORATION LLC    | 1/8+    | 924 144       | N/A        | N/A        |
| 10*17209          | 0   | 9-14-18 | ALICE G WEINER AND GERALD S WEINER               | TH EXPLORATION LLC    | 1/8+    | 915 131       | N/A        | N/A        |
| 10*17289          | 0   | 9-14-18 | GAYLE S SHANNON                                  | TH EXPLORATION LLC    | 1/8+    | 924 168       | N/A        | N/A        |
| 10*17396          | 0   | 9-14-18 | HAROLD R HUNT JR AND ELIZABETH A HUNT            | TH EXPLORATION LLC    | 1/8+    | 924 170       | N/A        | N/A        |
| 10*17413          | 0   | 9-14-18 | CHRISTINE L KIDD                                 | TH EXPLORATION LLC    | 1/8+    | 924 158       | N/A        | N/A        |
| 10*17436          | 0   | 9-14-18 | ROBERT M CHAMBERS AND CHARLOTTE A CHAMBERS       | TH EXPLORATION LLC    | 1/8+    | 924 160       | N/A        | N/A        |
| 10*17448          | 0   | 9-14-18 | ANDREW M HOOVER AND DINAH R HOOVER               | TH EXPLORATION LLC    | 1/8+    | 924 156       | N/A        | N/A        |
| 10*17452          | 0   | 9-14-18 | FREDERICK L HERVEY AND CATHY J HERVEY            | TH EXPLORATION LLC    | 1/8+    | 924 162       | N/A        | N/A        |
| 10*17486          | 0   | 9-14-18 | ALAN H & MARY K DEGAMMO                          | TH EXPLORATION LLC    | 1/8+    | 924 164       | N/A        | N/A        |
| 10*17487          | 0   | 9-14-18 | JOSELYN M KEELY                                  | TH EXPLORATION LLC    | 1/8+    | 929 364       | N/A        | N/A        |
| 10*17503          | 0   | 9-14-18 | DEBORAH R MOKOSH                                 | TH EXPLORATION LLC    | 1/8+    | 924 166       | N/A        | N/A        |
|                   |     |         | JANICE L KUHN                                    | TH EXPLORATION LLC    | 1/8+    | 924 122       | N/A        | N/A        |

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|-------------------|-----|---------|---|-----------------------|---------|-----------|------------|------------|
| 10*17504          | 0   | 9-14-18 | GREGG ALAN MILLER AND BETH ANN MILLER       | TH EXPLORATION LLC    | 1/8+    | 924 118   | N/A        | N/A        |
| 10*17505          | 0   | 9-14-18 | MICHAEL R & LEANNE DOBBS                    | TH EXPLORATION LLC    | 1/8+    | 924 116   | N/A        | N/A        |
| 10*17515          | 0   | 9-14-18 | GLADYS V DOBBS                              | TH EXPLORATION LLC    | 1/8+    | 923 541   | N/A        | N/A        |
| 10*17516          | 0   | 9-14-18 | MARY V DOBBS                                | TH EXPLORATION LLC    | 1/8+    | 923 539   | N/A        | N/A        |
| 10*17517          | 0   | 9-14-18 | JULIO ENRIQUE & DEBRA K TORRES              | TH EXPLORATION LLC    | 1/8+    | 923 537   | N/A        | N/A        |
| 10*17520          | 0   | 9-14-18 | LUCY P SULLIVAN                             | TH EXPLORATION LLC    | 1/8+    | 923 533   | N/A        | N/A        |
| 10*17528          | 0   | 9-14-18 | DEAN E GARRISON                             | TH EXPLORATION LLC    | 1/8+    | 923 535   | N/A        | N/A        |
| 10*17555          | 0   | 9-14-18 | AARON AND JANA K PARRY                      | TH EXPLORATION LLC    | 1/8+    | 923 528   | N/A        | N/A        |
| 10*17559          | 0   | 9-14-18 | MARVIN JERRY BLAKE AND LINDA D BLAKE        | TH EXPLORATION LLC    | 1/8+    | 924 110   | N/A        | N/A        |
| 10*17560          | 0   | 9-14-18 | TREVOR HOOKS                                | TH EXPLORATION LLC    | 1/8+    | 923 523   | N/A        | N/A        |
| 10*17563          | 0   | 9-14-18 | DONALD L WOOD                               | TH EXPLORATION LLC    | 1/8+    | 923 525   | N/A        | N/A        |
| 10*17579          | 0   | 9-14-18 | DON COFFIELD & GLENDA DOBBS                 | TH EXPLORATION LLC    | 1/8+    | 923 523   | N/A        | N/A        |
| 10*17580          | 0   | 9-14-18 | PAUL CRAIG CUNNINGHAM                       | TH EXPLORATION LLC    | 1/8+    | 923 530   | N/A        | N/A        |
| 10*17581          | 0   | 9-14-18 | PAULA WEIRRS                                | TH EXPLORATION LLC    | 1/8+    | 923 486   | N/A        | N/A        |
| 10*17582          | 0   | 9-14-18 | JOHN THOMAS ERAZMUS AND JEAN R ERAZMUS      | TH EXPLORATION LLC    | 1/8+    | 924 124   | N/A        | N/A        |
| 10*17612          | 0   | 9-14-18 | BEVERLY A LEDBETTER                         | TH EXPLORATION LLC    | 1/8+    | 923 480   | N/A        | N/A        |
| 10*17613          | 0   | 9-14-18 | CARLTON DOBBS JR AND MIKHAIL PROKOPEKO      | TH EXPLORATION LLC    | 1/8+    | 924 120   | N/A        | N/A        |
| 10*17614          | 0   | 9-14-18 | DAVID DOBBS                                 | TH EXPLORATION LLC    | 1/8+    | 923 489   | N/A        | N/A        |
| 10*17615          | 0   | 9-14-18 | PAULA JO WRIGHT                             | TH EXPLORATION LLC    | 1/8+    | 923 482   | N/A        | N/A        |
| 10*17616          | 0   | 9-14-18 | RONALD & ELIZABETH DOBBS                    | TH EXPLORATION LLC    | 1/8+    | 924 107   | N/A        | N/A        |
| 10*17617          | 0   | 9-14-18 | UNITED DISCIPLES OF CHRIST CHURCH           | TH EXPLORATION LLC    | 1/8+    | 924 129   | N/A        | N/A        |
| 10*17664          | 0   | 9-14-18 | RUDOLPH H PARSONS                           | TH EXPLORATION LLC    | 1/8+    | 923 511   | N/A        | N/A        |
| 10*17667          | 0   | 9-14-18 | THOMAS BRIAN WARRICK                        | TH EXPLORATION LLC    | 1/8+    | 923 509   | N/A        | N/A        |
| 10*17668          | 0   | 9-14-18 | KENNETH R DOBBS                             | TH EXPLORATION LLC    | 1/8+    | 923 503   | N/A        | N/A        |
| 10*17671          | 0   | 9-14-18 | JAMES L STOUT                               | TH EXPLORATION LLC    | 1/8+    | 923 484   | N/A        | N/A        |
| 10*17674          | 0   | 9-14-18 | HOWARD L & BETH E WOOD                      | TH EXPLORATION LLC    | 1/8+    | 923 505   | N/A        | N/A        |
| 10*17675          | 0   | 9-14-18 | GREGORY D & CAROLYN J WIBLE                 | TH EXPLORATION LLC    | 1/8+    | 923 507   | N/A        | N/A        |
| 10*17676          | 0   | 9-14-18 | JAMES C & DEIDRE G DORIA                    | TH EXPLORATION LLC    | 1/8+    | 923 513   | N/A        | N/A        |
| 10*17700          | 0   | 9-14-18 | ROGER L & MARILYN L GARRISON                | TH EXPLORATION LLC    | 1/8+    | 923 472   | N/A        | N/A        |
| 10*17701          | 0   | 9-14-18 | SUE ANN WORD                                | TH EXPLORATION LLC    | 1/8+    | 923 470   | N/A        | N/A        |
| 10*17702          | 0   | 9-14-18 | TAMMY BETH RAMSEY                           | TH EXPLORATION LLC    | 1/8+    | 925 500   | N/A        | N/A        |
| 10*17703          | 0   | 9-14-18 | SHIRLEY N COX                               | TH EXPLORATION LLC    | 1/8+    | 923 498   | N/A        | N/A        |
| 10*17708          | 0   | 9-14-18 | BETTY LOU NOBLE                             | TH EXPLORATION LLC    | 1/8+    | 924 127   | N/A        | N/A        |
| 10*17711          | 0   | 9-14-18 | DEBRA A WENNEMAN AND KURT J WENNEMAN        | TH EXPLORATION LLC    | 1/8+    | 923 520   | N/A        | N/A        |
| 10*17731          | 0   | 9-14-18 | JAMES J MCGHEE AND JEANNINE CHAMBERS MCGHEE | TH EXPLORATION LLC    | 1/8+    | 914 519   | N/A        | N/A        |
| 10*17766          | 0   | 9-14-18 | EDWARD S & NANCY A ROSENTHAL                | TH EXPLORATION LLC    | 1/8+    | 923 495   | N/A        | N/A        |
| 10*17767          | 0   | 9-14-18 | WILLIAM K & LINDA J MERRITT                 | TH EXPLORATION LLC    | 1/8+    | 923 474   | N/A        | N/A        |
| 10*17769          | 0   | 9-14-18 | GLADYS FRAZIER KING                         | TH EXPLORATION LLC    | 1/8+    | 923 492   | N/A        | N/A        |
| 10*17830          | 0   | 9-14-18 | CHARLES AND LISA WARRICK                    | TH EXPLORATION LLC    | 1/8+    | 923 477   | N/A        | N/A        |
| 10*17833          | 0   | 9-14-18 | BRIAN AND MELINDA MASTERS                   | TH EXPLORATION LLC    | 1/8+    | 929 296   | N/A        | N/A        |
| 10*17836          | 0   | 9-14-18 | KEVIN W & BONNIE J RANDOLPH                 | TH EXPLORATION LLC    | 1/8+    | 925 319   | N/A        | N/A        |
| 10*17837          | 0   | 9-14-18 | CAREY J & HAZEL M KENDALL                   | TH EXPLORATION LLC    | 1/8+    | 929 301   | N/A        | N/A        |
| 10*17838          | 0   | 9-14-18 | RONALD L & GLENDA F CROW                    | TH EXPLORATION LLC    | 1/8+    | 929 309   | N/A        | N/A        |
| 10*17839          | 0   | 9-14-18 | CHARLOTTE E MARRINER                        | TH EXPLORATION LLC    | 1/8+    | 929 299   | N/A        | N/A        |
| 10*17841          | 0   | 9-14-18 | EDDA JO DOBBS                               | TH EXPLORATION LLC    | 1/8+    | 930 15    | N/A        | N/A        |
| 10*17842          | 0   | 9-14-18 | BARBARA DOBBS GORBY                         | TH EXPLORATION LLC    | 1/8+    | 929 304   | N/A        | N/A        |
| 10*17878          | 0   | 9-14-18 | GARI JO STACKHOUSE                          | TH EXPLORATION LLC    | 1/8+    | 929 294   | N/A        | N/A        |
| 10*17879          | 0   | 9-14-18 | ROBERT E & SARAH M ROUSH                    | TH EXPLORATION LLC    | 1/8+    | 924 590   | N/A        | N/A        |
| 10*17880          | 0   | 9-14-18 | HARRY R WRIGHT JR                           | TH EXPLORATION LLC    | 1/8+    | 924 588   | N/A        | N/A        |
| 10*17881          | 0   | 9-14-18 | ANNA M WRIGHT                               | TH EXPLORATION LLC    | 1/8+    | 924 586   | N/A        | N/A        |
| 10*17885          | 0   | 9-14-18 | WANYON L & ANGELA J MURPHEE                 | TH EXPLORATION LLC    | 1/8+    | 924 555   | N/A        | N/A        |
| 10*47051.325.1    | 0   | 9-14-18 | JOHN RUSSELL BECKER                         | TH EXPLORATION LLC    | 1/8+    | 924 540   | N/A        | N/A        |
| 10*47051.325.2    | 0   | 9-14-18 | JUDITH A LEWMANDOSKY AND ALAN E LEWMANDOSKY | TH EXPLORATION LLC    | 1/8+    | 906 225   | N/A        | N/A        |
|                   |     |         | TIMMY LEE STOUT AND DOROTHY MARIE STOUT     | TH EXPLORATION LLC    | 1/8+    | 906 222   | N/A        | N/A        |

Operator's Well No. Heaven Hill 3 - 1HM

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WV Department of  
Environmental Protection

201935560  
 WV-6A1 Supplement

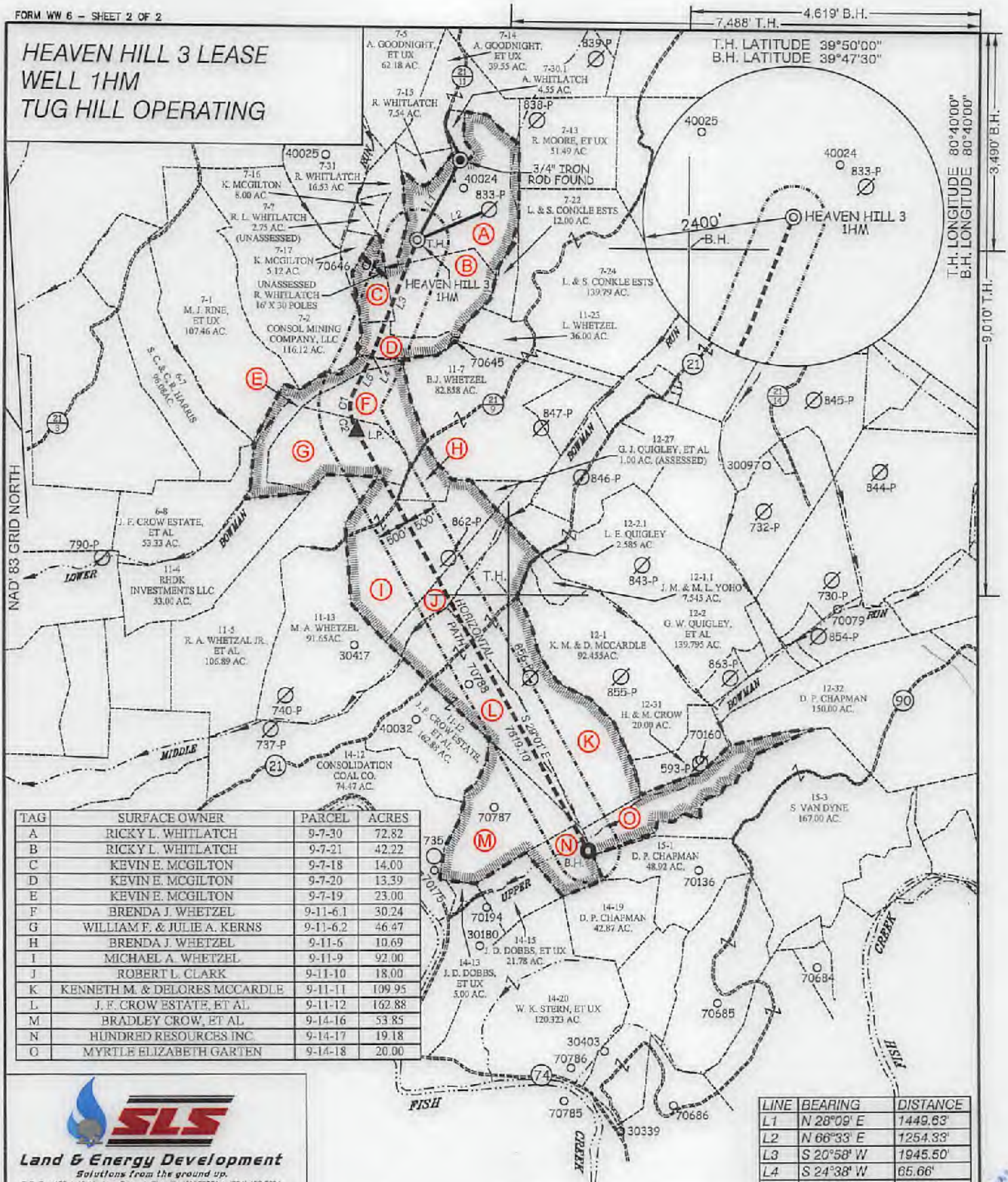
| Lease Name or No. | Tag | Parcel  | Grantor, Lessor, etc.                   | Grantee, Lessee, etc. | Royalty | Lease Book/Pa. | Assignment | Assignment | Assignment |
|-------------------|-----|---------|---|-----------------------|---------|----------------|------------|------------|------------|
| 10*47051.325.3    | O   | 9-14-18 | NICHOLAS D PAVLIK AND GLORIA K PAVLIK   | TH EXPLORATION LLC    | 1/8+    | 906 228        | N/A        | N/A        | N/A        |
| 10*47051.325.4    | O   | 9-14-18 | JAMES H WHITE AND RITA FRANKS WHITE     | TH EXPLORATION LLC    | 1/8+    | 906 230        | N/A        | N/A        | N/A        |
| 10*47051.325.5    | O   | 9-14-18 | SAMUEL ALAN MCCORD AND WINIFRED A MCKEE | TH EXPLORATION LLC    | 1/8+    | 906 232        | N/A        | N/A        | N/A        |
| 10*47051.325.6    | O   | 9-14-18 | THOMAS O MCCORD                         | TH EXPLORATION LLC    | 1/8+    | 906 235        | N/A        | N/A        | N/A        |
| 10*47051.325.7    | O   | 9-14-18 | SHERON JONES                            | TH EXPLORATION LLC    | 1/8+    | 906 237        | N/A        | N/A        | N/A        |
| 10*47051.325.8    | O   | 9-14-18 | RICK PAVLIK                             | TH EXPLORATION LLC    | 1/8+    | 906 239        | N/A        | N/A        | N/A        |

Operator's Well No. Heaven Hill 3 - 1HM

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 Office of Oil and Gas  
 FEB 6 2008  
 WV Department of  
 Environmental Protection



**HEAVEN HILL 3 LEASE  
WELL 1HM  
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   | WILLIAM F. & JULIE A. KERNS   | 9-11-6-2 | 46.47  |
| H   | BRENDA J. WHETZEL             | 9-11-6   | 10.69  |
| I   | MICHAEL A. WHETZEL            | 9-11-9   | 92.00  |
| J   | ROBERT L. CLARK               | 9-11-10  | 18.00  |
| K   | KENNETH M. & DELORES MCCARDLE | 9-11-11  | 109.95 |
| L   | J. F. CROW ESTATE, ET AL      | 9-11-12  | 162.88 |
| M   | BRADLEY CROW, ET AL           | 9-14-16  | 53.85  |
| N   | HUNDRED RESOURCES INC.        | 9-14-17  | 19.18  |
| O   | MYRTLE ELIZABETH GARTEN       | 9-14-18  | 20.00  |

| LINE | BEARING    | DISTANCE |
|------|------------|----------|
| L1   | N 28°09' E | 1449.63' |
| L2   | N 66°33' E | 1254.33' |
| L3   | S 20°58' W | 1945.50' |
| L4   | S 24°38' W | 65.66'   |
| L5   | S 27°01' W | 670.48'  |

| CURVE | ARC LENGTH | RADIUS  | CHORD BEARING | CHORD LENGTH |
|-------|------------|---------|---------------|--------------|
| C1    | 272.62'    | 464.82' | S 05°48' W    | 268.73'      |
| C2    | 310.09'    | 919.14' | S 19°33' E    | 308.62'      |

P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26031 • (304) 452-5634  
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. 478,859.71 E. 1,633,272.01  
 NAD'83 GEO. LAT-(N) 39.806800 LONG-(W) 80.693321  
 NAD'83 UTM (M) N. 4,406,558.99 E. 526,250.98  
LANDING POINT  
 NAD'83 S.P.C.(FT) N. 475,827.8 E. 1,632,320.3  
 NAD'83 GEO. LAT-(N) 39.800242 LONG-(W) 80.698565  
 NAD'83 UTM (M) N. 4,405,630.4 E. 525,976.5  
BOTTOM HOLE  
 NAD'83 S.P.C.(FT) N. 469,164.8 E. 1,638,015.7  
 NAD'83 GEO. LAT-(N) 39.782008 LONG-(W) 80.683101  
 NAD'83 UTM (M) N. 4,403,619.4 E. 527,136.2

SCALE 1" = 2000' FILE NO. 8654P1HMR3.dwg  
 DATE APRIL 20, 2017  
 REVISED AUGUST 30, 2017 & FEBRUARY 2, 2018  
 OPERATORS WELL NO. HEAVEN HILL 3-1HM  
 API WELL NO. 47 - 051 - 01935 MOD  
 STATE COUNTY PERMIT

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

(+) 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)

DD-00  
A

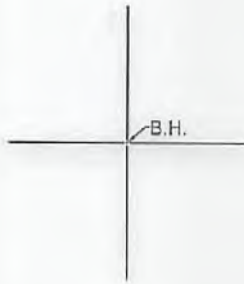
WELL OPERATOR TUG HILL OPERATING, LLC ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107  
 DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

**HEAVEN HILL 3 LEASE  
WELL 1HM  
TUG HILL OPERATING**

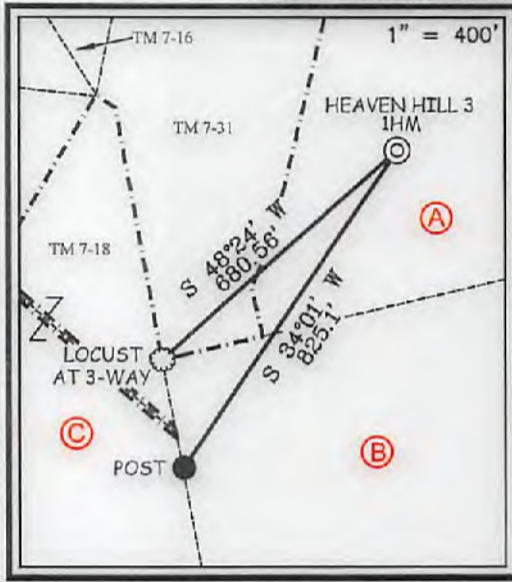
7,488' T.H. 4,619' B.H.  
T.H. LATITUDE 39°50'00"  
B.H. LATITUDE 39°47'30"

T.H. LONGITUDE 80°40'00"  
B.H. LONGITUDE 80°40'00"  
3,490' B.H.  
9,010' T.H.

| (S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH) |                   |                    |
|--|-------------------|--------------------|
| NAD'83 S.P.C.(FT)                          | N. 478,859.71     | E. 1,633,272.01    |
| NAD'83 GEO.                                | LAT-(N) 39.908600 | LONG-(W) 80.693321 |
| NAD'83 UTM (M)                             | N. 4,406,558.89   | E. 526,250.98      |
| LANDING POINT                              |                   |                    |
| NAD'83 S.P.C.(FT)                          | N. 475,827.8      | E. 1,632,320.3     |
| NAD'83 GEO.                                | LAT-(N) 39.900242 | LONG-(W) 80.696565 |
| NAD'83 UTM (M)                             | N. 4,405,630.4    | E. 525,978.5       |
| BOTTOM HOLE                                |                   |                    |
| NAD'83 S.P.C.(FT)                          | N. 469,164.9      | E. 1,638,015.7     |
| NAD'83 GEO.                                | LAT-(N) 39.782086 | LONG-(W) 80.663101 |
| NAD'83 UTM (M)                             | N. 4,403,819.4    | E. 527,136.2       |



**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 APRIL 20, 20 17  
REVISED AUGUST 30, 2017 & FEBRUARY 2, 2018  
OPERATORS WELL NO. HEAVEN HILL 3-1HM  
API WELL NO. 47-051-01935 MOD  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8654P1HMR3.dwg  
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

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

LOCATION: GROUND = 1,339.40' ELEVATION 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: 15,640'

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

COUNTY NAME PERMIT