west virginia department of environmental protection

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

Harold D. Ward, Cabinet Secretary
www.dep.wv.gov

Monday, April 5, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

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

Re: Permit Modification Approval for KEITH STERN S-12HM
47-051-02104-00-00

Casing Modifications

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: | KEITH STERN S-12HM |
| Farm Name: | TH EXPLORATION, LLC |
| U.S. WELL NUMBER: | 47-051-02104-00-00 |
| Horizontal 6A | New Drill |
| Date Modification Issued: | 4/5/2021 |

TUG HILL

March 3, 2021

WADE STANSBERRY
WV DEP OFFICE OF OIL & GAS
601 57TH STREET SE
CHARLESTON, WV 25304-2345

**VIA USPS**

**RE: Keith Stern S-12HM API #47-051-02104 (H6A Permit Modification)**
**Meade District, Marshall County, WV**

Dear Wade:

Tug Hill Operating, LLC is submitting a permit modification for its permitted well, Keith Stern S-12HM to update the freshwater depth as well as freshwater/coal casing string. Therefore, enclosed please find the following:

- Modified WW-6B with changes highlighted in yellow.
- WW-6A with certified mail receipts to notice appropriate parties of freshwater and coal string changes.

If you have any questions or need any additional information, please do not hesitate to call me at (304) 376-0111. Thank you for attention to this matter, it is greatly appreciated.

Sincerely,

Amy Morris

AMY MORRIS
PERMIT SPECIALIST-APPALACHIA REGION
TUG HILL OPERATING, LLC



Enclosures

WW-6B
(04/15)

Modification

API NO. 47- 051 - 02104
OPERATOR WELL NO. Keith Stern S-12HM
Well Pad Name: Keith Stern

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: Keith Stern S-12HM Well Pad Name: Keith Stern

3) Farm Name/Surface Owner: TH Exploration, LLC Public Road Access: Fish Creek Road (County Route 74)

4) Elevation, current ground: 747' Elevation, proposed post-construction: 747'

5) Well Type (a) Gas x Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow x Deep _____
Horizontal x

6) Existing Pad: Yes or No Yes

10/16/2020

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6264' - 6315', thickness of 51' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6415'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 14,022'

11) Proposed Horizontal Leg Length: 7,033.35'

12) Approximate Fresh Water Strata Depths: 70'; 406'

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

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 307' and Pittsburgh Coal - 400'

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

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

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


04/09/2021

WW-6B
(04/15)

API NO. 47- 051 - 02104
OPERATOR WELL NO. Keith Stern S-12HM
Well Pad Name: Keith Stern

18) **CASING AND TUBING PROGRAM**

| TYPE | Size (in) | New or Used | Grade | Weight per ft. (lb/ft) | FOOTAGE: For Drilling (ft) | INTERVALS: Left in Well (ft) | CEMENT: Fill-up (Cu. Ft.)/CTS |
|---|---|---|---|---|---|---|---|
| Conductor | 30" | NEW | BW | BW | 120' | 120' | 259ft^3(CTS) |
| Fresh Water | 13 3/8" | NEW | J55 | 54.5# | 490' | 490' | 690ft^3(CTS) |
| Coal | 13 3/8" | NEW | J55 | 54.5# | 490' | 490' | 690ft^3(CTS) |
| Intermediate | 9 5/8" | NEW | J55 | 36# | 2,203' | 2,203' | 714ft^3(CTS) |
| Production | 5 1/2" | NEW | P110 | 20# | 14,022' | 14,022' | 3592ft^3(CTS) |
| Tubing | 2 3/8" | NEW | N80 | 4.7# | 6,763' | | |
| Liners | | | | | | | |

10/16/2020

| TYPE | Size (in) | Wellbore Diameter (in) | Wall Thickness (in) | Burst Pressure (psi) | Anticipated Max. Internal Pressure (psi) | Cement Type | Cement Yield (cu. ft./k) |
|---|---|---|---|---|---|---|---|
| Conductor | 30" | 36" | 1.0 | 2,333 | 1,866 | CLASS A | 1.2 |
| Fresh Water | 13 3/8" | 17.5" | .33 | 2,740 | 2,192 | SEE #24 | 1.2 |
| Coal | 13 3/8" | 17.5" | .33 | 2,740 | 2,192 | SEE #24 | 1.2 |
| Intermediate | 9 5/8" | 12 1/4" | .352 | 3,520 | 2,816 | SEE #24 | 1.19 |
| Production | 5 1/2" | 8 7/8"_8 3/4" | .361 | 12,640 | 10,112 | SEE #24 | 1.17/1.19 |
| Tubing | 2 3/8" | | .19 | 11,200 | 8,960 | | |
| Liners | | | | | | | |

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**PACKERS**

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


04/09/2021

WW-6B
(10/14)

API NO. 47- 051 - 02104
OPERATOR WELL NO. Keith Stern S-12HM
Well Pad Name: Keith Stern

10/16/2020

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

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

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

Well to completed with approximately 17,580,000 lb. proppant and 271,800 barrels of water.
Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 10.35 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.32 acres

23) Describe centralizer placement for each casing string:

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

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

Sfc - Premium NE-1 + 2% CaCl; Int1 - Premium NE-1 + 1.5% CaCL + Flake; Int2 - Lead: Premium NE-1 + 5% BA-90 + .85% R-3 + 3% KCl + .75 gals/100sk FP-13L + 1% MPA-170 Tail: Premium NE-1 +.1% R-3 + 5% KCl + 1% CD-32 + .4% FL-52 +.2% ASA-301 + .6% Sodium Metasilicate; Kick Plug - Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L; Prod - Lead: 50:50 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .75 gal/100sk FP-13L Tail: 25:75 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .375 gal/100sk FP-13L

25) Proposed borehole conditioning procedures:

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



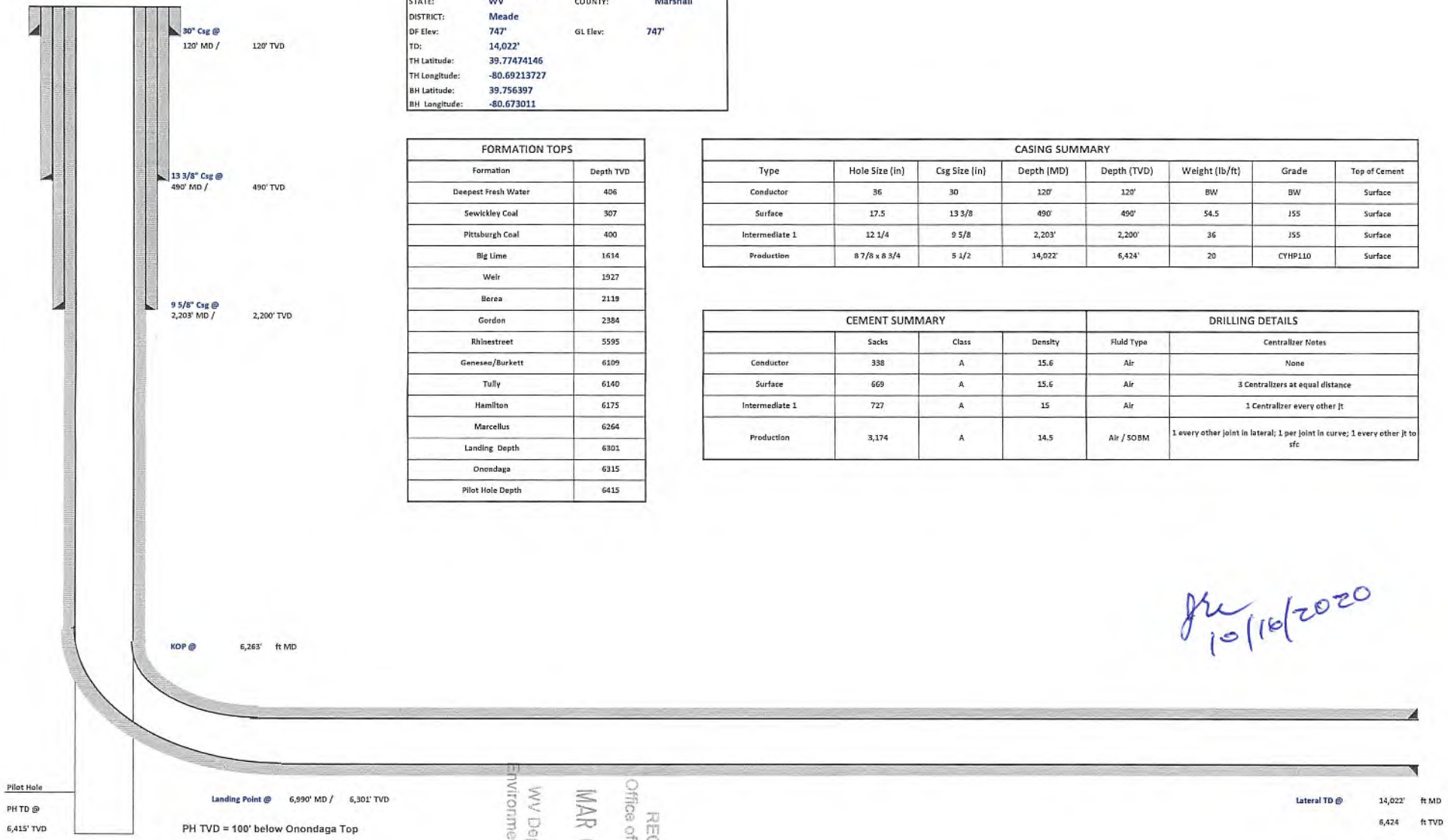
*Note: Attach additional sheets as needed.



04/09/2021

TUG HILL OPERATING

| | | | |
|---|---|---|---|
| WELL NAME: | Keith Stern S-12HM | | |
| STATE: | WV | COUNTY: | Marshall |
| DISTRICT: | Meade | | |
| DF Elev: | 747' | GL Elev: | 747' |
| TD: | 14,022' | | |
| TH Latitude: | 39.77474146 | | |
| TH Longitude: | -80.69213727 | | |
| BH Latitude: | 39.756397 | | |
| BH Longitude: | -80.673011 | | |




| FORMATION TOPS | |
|---|---|
| Formation | Depth TVD |
| Deepest Fresh Water | 406 |
| Sewickley Coal | 307 |
| Pittsburgh Coal | 400 |
| Big Lime | 1614 |
| Weir | 1927 |
| Berea | 2119 |
| Gordon | 2384 |
| Rhinestreet | 5595 |
| Geneseo/Burkett | 6109 |
| Tully | 6140 |
| Hamilton | 6175 |
| Marcellus | 6264 |
| Landing Depth | 6301 |
| Onondaga | 6315 |
| Pilot Hole Depth | 6415 |

| CASING SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Type | Hole Size (in) | Csg Size (in) | Depth (MD) | Depth (TVD) | Weight (lb/ft) | Grade | Top of Cement |
| Conductor | 36 | 30 | 120' | 120' | BW | BW | Surface |
| Surface | 17.5 | 13 3/8 | 490' | 490' | 54.5 | J55 | Surface |
| Intermediate 1 | 12 1/4 | 9 5/8 | 2,203' | 2,200' | 36 | J55 | Surface |
| Production | 8 7/8 x 8 3/4 | 5 1/2 | 14,022' | 6,424' | 20 | CYHP110 | Surface |

| | CEMENT SUMMARY | | | DRILLING DETAILS | |
|---|---|---|---|---|---|
| | Sacks | Class | Density | Fluid Type | Centralizer Notes |
| Conductor | 338 | A | 15.6 | Air | None |
| Surface | 669 | A | 15.6 | Air | 3 Centralizers at equal distance |
| Intermediate 1 | 727 | A | 15 | Air | 1 Centralizer every other jt |
| Production | 3,174 | A | 14.5 | Air / SOBM | 1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc |

10/16/2020

## Tug Hill Operating, LLC Casing and Cement Program

### Keith Stern S-12HM

## Casing

| | String | Grade | Bit Size | Depth (Measured) | Cement Fill Up |
|---|---|---|---|---|---|
| Conductor | 30" | BW | 36" | 120' | CTS |
| Surface | 13 3/8" | J55 | 17 1/2" | 490' | CTS |
| Intermediate | 9 5/8" | J55 | 12 1/4" | 2,203' | CTS |
| Production | 5 1/2" | CYHP110 | 8 7/8 x 8 3/4 | 14,022' | 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 |

TUG HILL OPERATING

**Well:** Keith Stern S-12 HM (slot N)
**Site:** Keith Stern
**Project:** Marshall County, West Virginia
**Design:** rev1

SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | VSect | Annotation |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2 | 1300.00 | 0.00 | 0.00 | 1300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | KOP Begin 2°/100' build |
| 3 | 1550.00 | 5.00 | 96.41 | 1549.68 | -1.22 | 10.83 | 2.00 | 96.41 | 7.77 | Begin 5.00° tangent |
| 4 | 3106.24 | 5.00 | 96.41 | 3100.00 | -16.36 | 145.62 | 0.00 | 0.00 | 104.40 | Begin 3°/100' build/turn |
| 5 | 3900.16 | 28.82 | 96.20 | 3854.14 | -41.26 | 373.52 | 3.00 | -0.25 | 267.23 | Begin 28.82° tangent |
| 6 | 6263.02 | 28.82 | 96.20 | 5924.39 | -164.33 | 1505.80 | 0.00 | 0.00 | 1075.78 | Begin 10°/100' build/turn |
| 7 | 6989.74 | 89.00 | 150.32 | 6301.00 | -552.35 | 1916.42 | 10.00 | 58.06 | 1635.78 | Begin 89.00° lateral section |
| 8 | 14021.81 | 89.00 | 150.32 | 6424.00 | -6660.66 | 5398.29 | 0.00 | 0.00 | 8573.56 | PBHL/TD 14021.80 MD/6424.00 TVD |

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

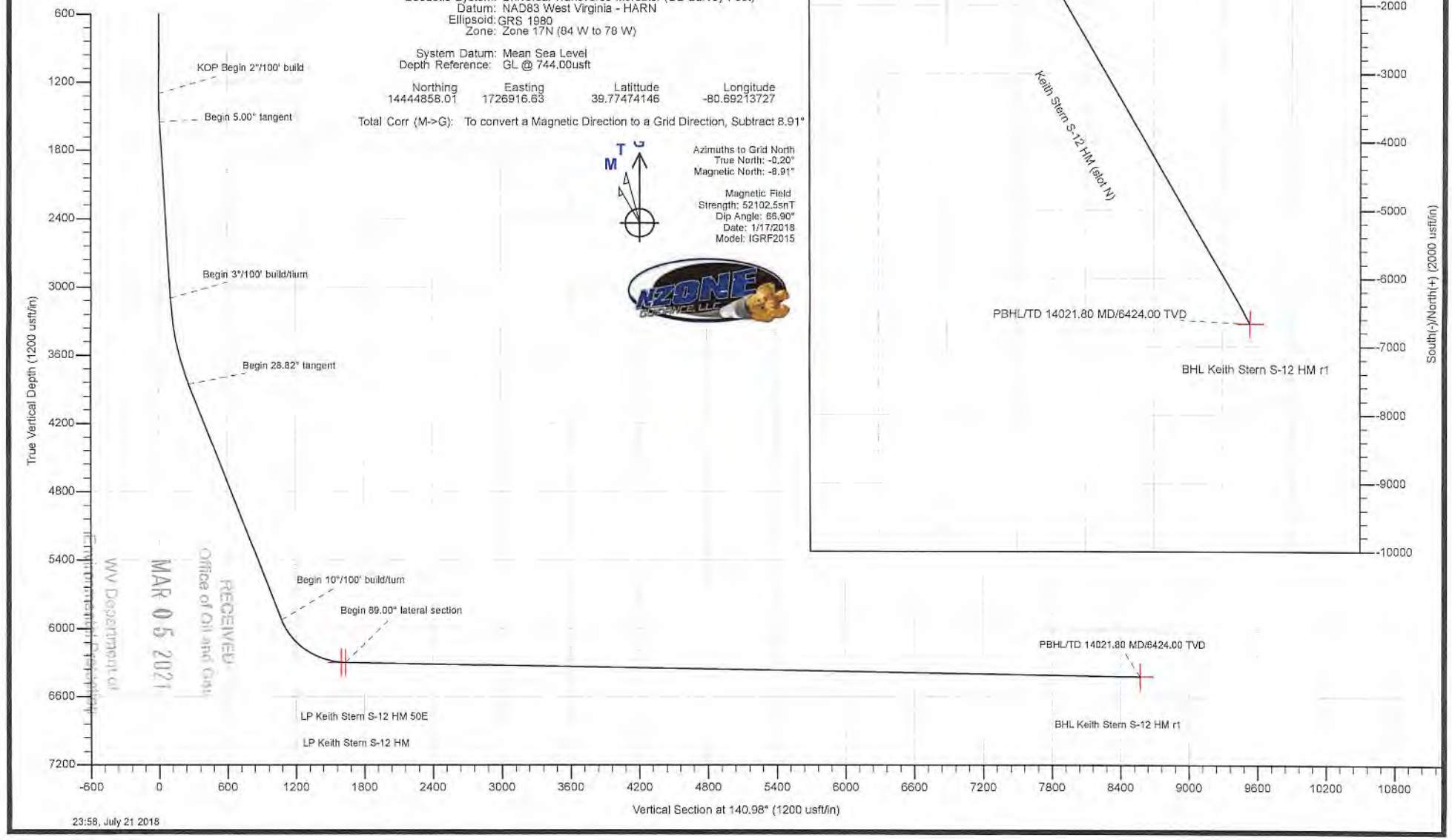
System Datum: Mean Sea Level
Depth Reference: GL @ 744.00usft

| Northing | Easting | Latitude | Longitude |
|---|---|---|---|
| 14444858.01 | 1726916.83 | 39.77474146 | -80.69213727 |

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.91°

Azimuths to Grid North
True North: -0.20°
Magnetic North: -8.91°

Magnetic Field
Strength: 52102.5snT
Dip Angle: 66.90°
Date: 1/17/2018
Model: IGRF2015









23:58, July 21 2018

TUG HILL OPERATING

# Planning Report - Geographic

| | | | |
|---|---|---|---|
| **Database:** | DB_Jul2216dt_v14 | **Local Co-ordinate Reference:** | Well Keith Stern S-12 HM (slot N) |
| **Company:** | Tug Hill Operating LLC | **TVD Reference:** | GL @ 744.00usft |
| **Project:** | Marshall County, West Virginia | **MD Reference:** | GL @ 744.00usft |
| **Site:** | Keith Stern | **North Reference:** | Grid |
| **Well:** | Keith Stern S-12 HM (slot N) | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Original Hole | | |
| **Design:** | rev1 | | |

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

| **Site** | Keith Stern | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 14,444,890.33 usft | **Latitude:** | 39.77483004 |
| **From:** | Lat/Long | **Easting:** | 1,726,932.47 usft | **Longitude:** | -80.69208048 |
| **Position Uncertainty:** | 0.00 usft | **Slot Radius:** | 13-3/16 " | **Grid Convergence:** | 0.20 ° |

| **Well** | Keith Stern S-12 HM (slot N) | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.00 usft | **Northing:** | 14,444,858.02 usft | **Latitude:** | 39.77474146 |
| | **+E/-W** | 0.00 usft | **Easting:** | 1,726,916.62 usft | **Longitude:** | -80.69213727 |
| **Position Uncertainty** | | 0.00 usft | **Wellhead Elevation:** | | **Ground Level:** | 744.00 usft |

| **Wellbore** | Original Hole | | | |
|---|---|---|---|---|
| **Magnetics** | **Model Name** | **Sample Date** | **Declination (°)** | **Dip Angle (°)** | **Field Strength (nT)** |
| | IGRF2015 | 1/17/2018 | -8.71 | 66.90 | 52,102.46908110 |

| **Design** | rev1 | | | | |
|---|---|---|---|---|---|
| **Audit Notes:** | | | | | |
| **Version:** | | **Phase:** | PLAN | **Tie On Depth:** | 0.00 |
| **Vertical Section:** | **Depth From (TVD) (usft)** | **+N/-S (usft)** | **+E/-W (usft)** | **Direction (°)** | |
| | 0.00 | 0.00 | 0.00 | 140.98 | |

**Plan Survey Tool Program** **Date** 7/21/2018

| | Depth From (usft) | Depth To (usft) | Survey (Wellbore) | Tool Name | Remarks |
|---|---|---|---|---|---|
| 1 | 0.00 | 14,021.81 | rev1 (Original Hole) | MWD | |
| | | | | MWD - Standard | |



**Plan Sections**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | TFO (°) | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,300.00 | 0.00 | 0.00 | 1,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,550.00 | 5.00 | 96.41 | 1,549.68 | -1.22 | 10.83 | 2.00 | 2.00 | 0.00 | 96.41 | |
| 3,106.24 | 5.00 | 96.41 | 3,100.00 | -16.36 | 145.62 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3,900.16 | 28.82 | 96.20 | 3,854.14 | -41.26 | 373.52 | 3.00 | 3.00 | -0.03 | -0.25 | |
| 6,263.02 | 28.82 | 96.20 | 5,924.39 | -164.33 | 1,505.80 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 6,989.74 | 89.00 | 150.32 | 6,301.00 | -552.35 | 1,916.42 | 10.00 | 8.28 | 7.45 | 58.06 | LP Keith Stern S-12 H |
| 14,021.81 | 89.00 | 150.32 | 6,424.00 | -6,660.66 | 5,398.29 | 0.00 | 0.00 | 0.00 | 0.00 | BHL Keith Stern S-12 |

| | | | |
|---|---|---|---|
| **Database:** | DB_Jul2216dt_v14 | **Local Co-ordinate Reference:** | Well Keith Stern S-12 HM (slot N) |
| **Company:** | Tug Hill Operating LLC | **TVD Reference:** | GL @ 744.00usft |
| **Project:** | Marshall County, West Virginia | **MD Reference:** | GL @ 744.00usft |
| **Site:** | Keith Stern | **North Reference:** | Grid |
| **Well:** | Keith Stern S-12 HM (slot N) | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Original Hole | | |
| **Design:** | rev1 | | |



**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 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 900.00 | 0.00 | 0.00 | 900.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 1,000.00 | 0.00 | 0.00 | 1,000.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 1,100.00 | 0.00 | 0.00 | 1,100.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 1,200.00 | 0.00 | 0.00 | 1,200.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| 1,300.00 | 0.00 | 0.00 | 1,300.00 | 0.00 | 0.00 | 14,444,858.02 | 1,726,916.62 | 39.77474146 | -80.69213727 |
| **KOP Begin 2°/100' build** | | | | | | | | | |
| 1,400.00 | 2.00 | 96.41 | 1,399.98 | -0.19 | 1.73 | 14,444,857.82 | 1,726,918.36 | 39.77474091 | -80.69213110 |
| 1,500.00 | 4.00 | 96.41 | 1,499.83 | -0.78 | 6.93 | 14,444,857.24 | 1,726,923.56 | 39.77473926 | -80.69211260 |
| 1,550.00 | 5.00 | 96.41 | 1,549.68 | -1.22 | 10.83 | 14,444,856.80 | 1,726,927.46 | 39.77473802 | -80.69209873 |
| **Begin 5.00° tangent** | | | | | | | | | |
| 1,600.00 | 5.00 | 96.41 | 1,599.49 | -1.70 | 15.16 | 14,444,856.31 | 1,726,931.79 | 39.77473664 | -80.69208332 |
| 1,700.00 | 5.00 | 96.41 | 1,699.11 | -2.68 | 23.82 | 14,444,855.34 | 1,726,940.45 | 39.77473389 | -80.69205251 |
| 1,800.00 | 5.00 | 96.41 | 1,798.73 | -3.65 | 32.49 | 14,444,854.37 | 1,726,949.11 | 39.77473113 | -80.69202170 |
| 1,900.00 | 5.00 | 96.41 | 1,898.35 | -4.62 | 41.15 | 14,444,853.39 | 1,726,957.77 | 39.77472838 | -80.69199088 |
| 2,000.00 | 5.00 | 96.41 | 1,997.97 | -5.60 | 49.81 | 14,444,852.42 | 1,726,966.43 | 39.77472562 | -80.69196007 |
| 2,100.00 | 5.00 | 96.41 | 2,097.59 | -6.57 | 58.47 | 14,444,851.45 | 1,726,975.09 | 39.77472287 | -80.69192926 |
| 2,200.00 | 5.00 | 96.41 | 2,197.21 | -7.54 | 67.13 | 14,444,850.48 | 1,726,983.75 | 39.77472012 | -80.69189844 |
| 2,300.00 | 5.00 | 96.41 | 2,296.82 | -8.51 | 75.79 | 14,444,849.50 | 1,726,992.42 | 39.77471736 | -80.69186763 |
| 2,400.00 | 5.00 | 96.41 | 2,396.44 | -9.49 | 84.45 | 14,444,848.53 | 1,727,001.08 | 39.77471461 | -80.69183682 |
| 2,500.00 | 5.00 | 96.41 | 2,496.06 | -10.46 | 93.11 | 14,444,847.56 | 1,727,009.74 | 39.77471185 | -80.69180600 |
| 2,599.99 | 5.00 | 96.41 | 2,595.68 | -11.43 | 101.77 | 14,444,846.58 | 1,727,018.40 | 39.77470910 | -80.69177519 |
| 2,699.99 | 5.00 | 96.41 | 2,695.30 | -12.41 | 110.44 | 14,444,845.61 | 1,727,027.06 | 39.77470635 | -80.69174438 |
| 2,799.99 | 5.00 | 96.41 | 2,794.92 | -13.38 | 119.10 | 14,444,844.64 | 1,727,035.72 | 39.77470359 | -80.69171356 |
| 2,899.99 | 5.00 | 96.41 | 2,894.54 | -14.35 | 127.76 | 14,444,843.66 | 1,727,044.38 | 39.77470084 | -80.69168275 |
| 2,999.99 | 5.00 | 96.41 | 2,994.16 | -15.33 | 136.42 | 14,444,842.69 | 1,727,053.04 | 39.77469808 | -80.69165194 |
| 3,099.99 | 5.00 | 96.41 | 3,093.78 | -16.30 | 145.08 | 14,444,841.72 | 1,727,061.70 | 39.77469533 | -80.69162112 |
| 3,106.24 | 5.00 | 96.41 | 3,100.00 | -16.36 | 145.62 | 14,444,841.66 | 1,727,062.24 | 39.77469516 | -80.69161920 |
| **Begin 3°/100' build/turn** | | | | | | | | | |
| 3,199.99 | 7.81 | 96.32 | 3,193.16 | -17.52 | 156.02 | 14,444,840.50 | 1,727,072.64 | 39.77469188 | -80.69158221 |
| 3,299.99 | 10.81 | 96.28 | 3,291.83 | -19.29 | 172.10 | 14,444,838.73 | 1,727,088.72 | 39.77468685 | -80.69152500 |
| 3,399.99 | 13.81 | 96.25 | 3,389.52 | -21.62 | 193.29 | 14,444,836.40 | 1,727,109.92 | 39.77468027 | -80.69144959 |
| 3,499.99 | 16.81 | 96.24 | 3,485.96 | -24.49 | 219.54 | 14,444,833.53 | 1,727,136.17 | 39.77467213 | -80.69135621 |
| 3,599.99 | 19.81 | 96.22 | 3,580.88 | -27.90 | 250.77 | 14,444,830.12 | 1,727,167.40 | 39.77466248 | -80.69124510 |
| 3,699.99 | 22.81 | 96.22 | 3,674.03 | -31.84 | 286.90 | 14,444,826.18 | 1,727,203.53 | 39.77465132 | -80.69111656 |
| 3,799.99 | 25.81 | 96.21 | 3,765.15 | -36.29 | 327.83 | 14,444,821.73 | 1,727,244.45 | 39.77463870 | -80.69097096 |
| 3,899.99 | 28.81 | 96.20 | 3,853.99 | -41.25 | 373.44 | 14,444,816.77 | 1,727,290.06 | 39.77462465 | -80.69080870 |
| 3,900.16 | 28.82 | 96.20 | 3,854.14 | -41.26 | 373.52 | 14,444,816.76 | 1,727,290.14 | 39.77462462 | -80.69080841 |
| **Begin 28.82° tangent** | | | | | | | | | |
| 3,999.99 | 28.82 | 96.20 | 3,941.61 | -46.46 | 421.36 | 14,444,811.56 | 1,727,337.98 | 39.77460989 | -80.69063821 |
| 4,099.99 | 28.82 | 96.20 | 4,029.23 | -51.67 | 469.28 | 14,444,806.35 | 1,727,385.90 | 39.77459513 | -80.69046773 |
| 4,199.99 | 28.82 | 96.20 | 4,116.84 | -56.87 | 517.20 | 14,444,801.14 | 1,727,433.82 | 39.77458037 | -80.69029724 |
| 4,299.99 | 28.82 | 96.20 | 4,204.46 | -62.08 | 565.12 | 14,444,795.93 | 1,727,481.74 | 39.77456561 | -80.69012676 |
| 4,399.99 | 28.82 | 96.20 | 4,292.07 | -67.29 | 613.04 | 14,444,790.73 | 1,727,529.66 | 39.77455085 | -80.68995627 |
| 4,499.99 | 28.82 | 96.20 | 4,379.69 | -72.50 | 660.96 | 14,444,785.52 | 1,727,577.58 | 39.77453609 | -80.68978579 |
| 4,599.99 | 28.82 | 96.20 | 4,467.30 | -77.71 | 708.88 | 14,444,780.31 | 1,727,625.50 | 39.77452133 | -80.68961530 |

| | | | |
|---|---|---|---|
| **Database:** | DB_Jul2216dt_v14 | **Local Co-ordinate Reference:** | Well Keith Stern S-12 HM (slot N) |
| **Company:** | Tug Hill Operating LLC | **TVD Reference:** | GL @ 744.00usft |
| **Project:** | Marshall County, West Virginia | **MD Reference:** | GL @ 744.00usft |
| **Site:** | Keith Stern | **North Reference:** | Grid |
| **Well:** | Keith Stern S-12 HM (slot N) | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Original Hole | | |
| **Design:** | rev1 | | |



**Planned Survey**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| 4,699.99 | 28.82 | 96.20 | 4,554.92 | -82.92 | 756.79 | 14,444,775.10 | 1,727,673.42 | 39.77450657 | -80.68944482 |
| 4,799.99 | 28.82 | 96.20 | 4,642.54 | -88.13 | 804.71 | 14,444,769.89 | 1,727,721.34 | 39.77449181 | -80.68927433 |
| 4,899.99 | 28.82 | 96.20 | 4,730.15 | -93.33 | 852.63 | 14,444,764.68 | 1,727,769.26 | 39.77447705 | -80.68910385 |
| 4,999.99 | 28.82 | 96.20 | 4,817.77 | -98.54 | 900.55 | 14,444,759.47 | 1,727,817.18 | 39.77446229 | -80.68893336 |
| 5,099.99 | 28.82 | 96.20 | 4,905.38 | -103.75 | 948.47 | 14,444,754.26 | 1,727,865.10 | 39.77444753 | -80.68876288 |
| 5,199.99 | 28.82 | 96.20 | 4,993.00 | -108.96 | 996.39 | 14,444,749.06 | 1,727,913.02 | 39.77443277 | -80.68859239 |
| 5,299.99 | 28.82 | 96.20 | 5,080.61 | -114.17 | 1,044.31 | 14,444,743.85 | 1,727,960.94 | 39.77441800 | -80.68842191 |
| 5,399.99 | 28.82 | 96.20 | 5,168.23 | -119.38 | 1,092.23 | 14,444,738.64 | 1,728,008.86 | 39.77440324 | -80.68825142 |
| 5,499.99 | 28.82 | 96.20 | 5,255.85 | -124.59 | 1,140.15 | 14,444,733.43 | 1,728,056.78 | 39.77438848 | -80.68808094 |
| 5,599.99 | 28.82 | 96.20 | 5,343.46 | -129.79 | 1,188.07 | 14,444,728.22 | 1,728,104.70 | 39.77437372 | -80.68791046 |
| 5,699.99 | 28.82 | 96.20 | 5,431.08 | -135.00 | 1,235.99 | 14,444,723.01 | 1,728,152.62 | 39.77435895 | -80.68773997 |
| 5,799.99 | 28.82 | 96.20 | 5,518.69 | -140.21 | 1,283.91 | 14,444,717.80 | 1,728,200.54 | 39.77434419 | -80.68756949 |
| 5,899.99 | 28.82 | 96.20 | 5,606.31 | -145.42 | 1,331.83 | 14,444,712.60 | 1,728,248.46 | 39.77432943 | -80.68739900 |
| 5,999.99 | 28.82 | 96.20 | 5,693.93 | -150.63 | 1,379.75 | 14,444,707.39 | 1,728,296.38 | 39.77431466 | -80.68722852 |
| 6,099.99 | 28.82 | 96.20 | 5,781.54 | -155.84 | 1,427.67 | 14,444,702.18 | 1,728,344.30 | 39.77429990 | -80.68705804 |
| 6,199.99 | 28.82 | 96.20 | 5,869.16 | -161.05 | 1,475.59 | 14,444,696.97 | 1,728,392.22 | 39.77428514 | -80.68688755 |
| 6,263.02 | 28.82 | 96.20 | 5,924.38 | -164.33 | 1,505.80 | 14,444,693.69 | 1,728,422.42 | 39.77427583 | -80.68678009 |
| **Begin 10°/100' build/turn** | | | | | | | | | |
| 6,299.99 | 30.92 | 102.32 | 5,956.45 | -167.32 | 1,523.94 | 14,444,690.70 | 1,728,440.57 | 39.77426745 | -80.68671556 |
| 6,399.99 | 37.73 | 115.37 | 6,039.09 | -185.96 | 1,576.82 | 14,444,672.06 | 1,728,493.45 | 39.77421576 | -80.68652758 |
| 6,499.99 | 45.59 | 124.72 | 6,113.82 | -219.49 | 1,633.98 | 14,444,638.52 | 1,728,550.60 | 39.77412310 | -80.68632459 |
| 6,599.99 | 54.02 | 131.78 | 6,178.34 | -266.92 | 1,693.66 | 14,444,591.10 | 1,728,610.29 | 39.77399230 | -80.68611276 |
| 6,699.99 | 62.79 | 137.44 | 6,230.71 | -326.78 | 1,754.06 | 14,444,531.24 | 1,728,670.69 | 39.77382732 | -80.68589853 |
| 6,799.99 | 71.75 | 142.26 | 6,269.33 | -397.26 | 1,813.35 | 14,444,460.76 | 1,728,729.98 | 39.77363318 | -80.68568841 |
| 6,899.99 | 80.82 | 146.61 | 6,293.04 | -476.22 | 1,869.72 | 14,444,381.79 | 1,728,786.35 | 39.77341578 | -80.68548878 |
| 6,989.74 | 89.00 | 150.32 | 6,301.00 | -552.35 | 1,916.42 | 14,444,305.67 | 1,728,833.04 | 39.77320627 | -80.68532353 |
| **Begin 89.00° lateral section** | | | | | | | | | |
| 6,999.99 | 89.00 | 150.32 | 6,301.18 | -561.25 | 1,921.49 | 14,444,296.77 | 1,728,838.12 | 39.77318178 | -80.68530559 |
| 7,099.99 | 89.00 | 150.32 | 6,302.93 | -648.11 | 1,971.01 | 14,444,209.90 | 1,728,887.63 | 39.77294275 | -80.68513046 |
| 7,199.99 | 89.00 | 150.32 | 6,304.68 | -734.98 | 2,020.52 | 14,444,123.04 | 1,728,937.14 | 39.77270372 | -80.68495532 |
| 7,299.99 | 89.00 | 150.32 | 6,306.43 | -821.84 | 2,070.03 | 14,444,036.18 | 1,728,986.66 | 39.77246470 | -80.68478019 |
| 7,399.99 | 89.00 | 150.32 | 6,308.18 | -908.70 | 2,119.55 | 14,443,949.31 | 1,729,036.17 | 39.77222567 | -80.68460507 |
| 7,499.99 | 89.00 | 150.32 | 6,309.92 | -995.57 | 2,169.06 | 14,443,862.45 | 1,729,085.69 | 39.77198664 | -80.68442994 |
| 7,599.98 | 89.00 | 150.32 | 6,311.67 | -1,082.43 | 2,218.58 | 14,443,775.59 | 1,729,135.20 | 39.77174761 | -80.68425481 |
| 7,699.98 | 89.00 | 150.32 | 6,313.42 | -1,169.30 | 2,268.09 | 14,443,688.72 | 1,729,184.71 | 39.77150858 | -80.68407969 |
| 7,799.98 | 89.00 | 150.32 | 6,315.17 | -1,256.16 | 2,317.60 | 14,443,601.86 | 1,729,234.23 | 39.77126955 | -80.68390456 |
| 7,899.98 | 89.00 | 150.32 | 6,316.92 | -1,343.02 | 2,367.12 | 14,443,515.00 | 1,729,283.74 | 39.77103052 | -80.68372944 |
| 7,999.98 | 89.00 | 150.32 | 6,318.67 | -1,429.89 | 2,416.63 | 14,443,428.13 | 1,729,333.26 | 39.77079149 | -80.68355432 |
| 8,099.98 | 89.00 | 150.32 | 6,320.42 | -1,516.75 | 2,466.15 | 14,443,341.27 | 1,729,382.77 | 39.77055246 | -80.68337920 |
| 8,199.98 | 89.00 | 150.32 | 6,322.17 | -1,603.61 | 2,515.66 | 14,443,254.40 | 1,729,432.28 | 39.77031343 | -80.68320408 |
| 8,299.98 | 89.00 | 150.32 | 6,323.92 | -1,690.48 | 2,565.17 | 14,443,167.54 | 1,729,481.80 | 39.77007440 | -80.68302896 |
| 8,399.98 | 89.00 | 150.32 | 6,325.67 | -1,777.34 | 2,614.69 | 14,443,080.68 | 1,729,531.31 | 39.76983537 | -80.68285384 |
| 8,499.98 | 89.00 | 150.32 | 6,327.42 | -1,864.20 | 2,664.20 | 14,442,993.81 | 1,729,580.83 | 39.76959634 | -80.68267873 |
| 8,599.98 | 89.00 | 150.32 | 6,329.17 | -1,951.07 | 2,713.72 | 14,442,906.95 | 1,729,630.34 | 39.76935731 | -80.68250361 |
| 8,699.98 | 89.00 | 150.32 | 6,330.91 | -2,037.93 | 2,763.23 | 14,442,820.09 | 1,729,679.86 | 39.76911828 | -80.68232850 |
| 8,799.98 | 89.00 | 150.32 | 6,332.66 | -2,124.79 | 2,812.74 | 14,442,733.22 | 1,729,729.37 | 39.76887924 | -80.68215339 |
| 8,899.98 | 89.00 | 150.32 | 6,334.41 | -2,211.66 | 2,862.26 | 14,442,646.36 | 1,729,778.88 | 39.76864021 | -80.68197828 |
| 8,999.98 | 89.00 | 150.32 | 6,336.16 | -2,298.52 | 2,911.77 | 14,442,559.50 | 1,729,828.40 | 39.76840118 | -80.68180317 |
| 9,099.98 | 89.00 | 150.32 | 6,337.91 | -2,385.38 | 2,961.29 | 14,442,472.63 | 1,729,877.91 | 39.76816215 | -80.68162806 |
| 9,199.98 | 89.00 | 150.32 | 6,339.66 | -2,472.25 | 3,010.80 | 14,442,385.77 | 1,729,927.43 | 39.76792311 | -80.68145295 |
| 9,299.98 | 89.00 | 150.32 | 6,341.41 | -2,559.11 | 3,060.32 | 14,442,298.91 | 1,729,976.94 | 39.76768408 | -80.68127785 |
| 9,399.98 | 89.00 | 150.32 | 6,343.16 | -2,645.97 | 3,109.83 | 14,442,212.04 | 1,730,026.45 | 39.76744504 | -80.68110274 |
| 9,499.98 | 89.00 | 150.32 | 6,344.91 | -2,732.84 | 3,159.34 | 14,442,125.18 | 1,730,075.97 | 39.76720601 | -80.68092764 |
| 9,599.98 | 89.00 | 150.32 | 6,346.66 | -2,819.70 | 3,208.86 | 14,442,038.32 | 1,730,125.48 | 39.76696698 | -80.68075253 |



04/09/2021

| | | | |
|---|---|---|---|
| **Database:** | DB_Jul2216dt_v14 | **Local Co-ordinate Reference:** | Well Keith Stern S-12 HM (slot N) |
| **Company:** | Tug Hill Operating LLC | **TVD Reference:** | GL @ 744.00usft |
| **Project:** | Marshall County, West Virginia | **MD Reference:** | GL @ 744.00usft |
| **Site:** | Keith Stern | **North Reference:** | Grid |
| **Well:** | Keith Stern S-12 HM (slot N) | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Original Hole | | |
| **Design:** | rev1 | | |



**Planned Survey**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| 9,699.98 | 89.00 | 150.32 | 6,348.41 | -2,906.56 | 3,258.37 | 14,441,951.45 | 1,730,175.00 | 39.76672794 | -80.68057743 |
| 9,799.98 | 89.00 | 150.32 | 6,350.15 | -2,993.43 | 3,307.89 | 14,441,864.59 | 1,730,224.51 | 39.76648891 | -80.68040233 |
| 9,899.98 | 89.00 | 150.32 | 6,351.90 | -3,080.29 | 3,357.40 | 14,441,777.73 | 1,730,274.02 | 39.76624987 | -80.68022723 |
| 9,999.98 | 89.00 | 150.32 | 6,353.65 | -3,167.15 | 3,406.91 | 14,441,690.86 | 1,730,323.54 | 39.76601084 | -80.68005214 |
| 10,099.98 | 89.00 | 150.32 | 6,355.40 | -3,254.02 | 3,456.43 | 14,441,604.00 | 1,730,373.05 | 39.76577180 | -80.67987704 |
| 10,199.98 | 89.00 | 150.32 | 6,357.15 | -3,340.88 | 3,505.94 | 14,441,517.14 | 1,730,422.57 | 39.76553277 | -80.67970195 |
| 10,299.98 | 89.00 | 150.32 | 6,358.90 | -3,427.74 | 3,555.46 | 14,441,430.27 | 1,730,472.08 | 39.76529373 | -80.67952685 |
| 10,399.98 | 89.00 | 150.32 | 6,360.65 | -3,514.61 | 3,604.97 | 14,441,343.41 | 1,730,521.59 | 39.76505469 | -80.67935176 |
| 10,499.98 | 89.00 | 150.32 | 6,362.40 | -3,601.47 | 3,654.48 | 14,441,256.55 | 1,730,571.11 | 39.76481566 | -80.67917667 |
| 10,599.98 | 89.00 | 150.32 | 6,364.15 | -3,688.34 | 3,704.00 | 14,441,169.68 | 1,730,620.62 | 39.76457662 | -80.67900158 |
| 10,699.98 | 89.00 | 150.32 | 6,365.90 | -3,775.20 | 3,753.51 | 14,441,082.82 | 1,730,670.14 | 39.76433758 | -80.67882649 |
| 10,799.98 | 89.00 | 150.32 | 6,367.65 | -3,862.06 | 3,803.03 | 14,440,995.96 | 1,730,719.65 | 39.76409854 | -80.67865140 |
| 10,899.98 | 89.00 | 150.32 | 6,369.40 | -3,948.93 | 3,852.54 | 14,440,909.09 | 1,730,769.16 | 39.76385951 | -80.67847631 |
| 10,999.98 | 89.00 | 150.32 | 6,371.14 | -4,035.79 | 3,902.05 | 14,440,822.23 | 1,730,818.68 | 39.76362047 | -80.67830123 |
| 11,099.98 | 89.00 | 150.32 | 6,372.89 | -4,122.65 | 3,951.57 | 14,440,735.36 | 1,730,868.19 | 39.76338143 | -80.67812614 |
| 11,199.98 | 89.00 | 150.32 | 6,374.64 | -4,209.52 | 4,001.08 | 14,440,648.50 | 1,730,917.71 | 39.76314239 | -80.67795106 |
| 11,299.98 | 89.00 | 150.32 | 6,376.39 | -4,296.38 | 4,050.60 | 14,440,561.64 | 1,730,967.22 | 39.76290335 | -80.67777598 |
| 11,399.98 | 89.00 | 150.32 | 6,378.14 | -4,383.24 | 4,100.11 | 14,440,474.77 | 1,731,016.73 | 39.76266431 | -80.67760090 |
| 11,499.98 | 89.00 | 150.32 | 6,379.89 | -4,470.11 | 4,149.62 | 14,440,387.91 | 1,731,066.25 | 39.76242527 | -80.67742582 |
| 11,599.98 | 89.00 | 150.32 | 6,381.64 | -4,556.97 | 4,199.14 | 14,440,301.05 | 1,731,115.76 | 39.76218623 | -80.67725074 |
| 11,699.98 | 89.00 | 150.32 | 6,383.39 | -4,643.83 | 4,248.65 | 14,440,214.18 | 1,731,165.28 | 39.76194720 | -80.67707566 |
| 11,799.98 | 89.00 | 150.32 | 6,385.14 | -4,730.70 | 4,298.17 | 14,440,127.32 | 1,731,214.79 | 39.76170815 | -80.67690059 |
| 11,899.98 | 89.00 | 150.32 | 6,386.89 | -4,817.56 | 4,347.68 | 14,440,040.46 | 1,731,264.31 | 39.76146911 | -80.67672551 |
| 11,999.98 | 89.00 | 150.32 | 6,388.64 | -4,904.42 | 4,397.19 | 14,439,953.59 | 1,731,313.82 | 39.76123007 | -80.67655044 |
| 12,099.98 | 89.00 | 150.32 | 6,390.38 | -4,991.29 | 4,446.71 | 14,439,866.73 | 1,731,363.33 | 39.76099103 | -80.67637537 |
| 12,199.98 | 89.00 | 150.32 | 6,392.13 | -5,078.15 | 4,496.22 | 14,439,779.87 | 1,731,412.85 | 39.76075199 | -80.67620030 |
| 12,299.98 | 89.00 | 150.32 | 6,393.88 | -5,165.01 | 4,545.74 | 14,439,693.00 | 1,731,462.36 | 39.76051295 | -80.67602523 |
| 12,399.98 | 89.00 | 150.32 | 6,395.63 | -5,251.88 | 4,595.25 | 14,439,606.14 | 1,731,511.88 | 39.76027391 | -80.67585016 |
| 12,499.98 | 89.00 | 150.32 | 6,397.38 | -5,338.74 | 4,644.77 | 14,439,519.28 | 1,731,561.39 | 39.76003487 | -80.67567509 |
| 12,599.98 | 89.00 | 150.32 | 6,399.13 | -5,425.60 | 4,694.28 | 14,439,432.41 | 1,731,610.90 | 39.75979582 | -80.67550003 |
| 12,699.97 | 89.00 | 150.32 | 6,400.88 | -5,512.47 | 4,743.79 | 14,439,345.55 | 1,731,660.42 | 39.75955678 | -80.67532496 |
| 12,799.97 | 89.00 | 150.32 | 6,402.63 | -5,599.33 | 4,793.31 | 14,439,258.69 | 1,731,709.93 | 39.75931774 | -80.67514990 |
| 12,899.97 | 89.00 | 150.32 | 6,404.38 | -5,686.19 | 4,842.82 | 14,439,171.82 | 1,731,759.45 | 39.75907870 | -80.67497483 |
| 12,999.97 | 89.00 | 150.32 | 6,406.13 | -5,773.06 | 4,892.34 | 14,439,084.96 | 1,731,808.96 | 39.75883965 | -80.67479977 |
| 13,099.97 | 89.00 | 150.32 | 6,407.88 | -5,859.92 | 4,941.85 | 14,438,998.10 | 1,731,858.47 | 39.75860061 | -80.67462471 |
| 13,199.97 | 89.00 | 150.32 | 6,409.63 | -5,946.78 | 4,991.36 | 14,438,911.23 | 1,731,907.99 | 39.75836156 | -80.67444965 |
| 13,299.97 | 89.00 | 150.32 | 6,411.37 | -6,033.65 | 5,040.88 | 14,438,824.37 | 1,731,957.50 | 39.75812252 | -80.67427460 |
| 13,399.97 | 89.00 | 150.32 | 6,413.12 | -6,120.51 | 5,090.39 | 14,438,737.51 | 1,732,007.02 | 39.75788348 | -80.67409954 |
| 13,499.97 | 89.00 | 150.32 | 6,414.87 | -6,207.38 | 5,139.91 | 14,438,650.64 | 1,732,056.53 | 39.75764443 | -80.67392448 |
| 13,599.97 | 89.00 | 150.32 | 6,416.62 | -6,294.24 | 5,189.42 | 14,438,563.78 | 1,732,106.04 | 39.75740539 | -80.67374943 |
| 13,699.97 | 89.00 | 150.32 | 6,418.37 | -6,381.10 | 5,238.93 | 14,438,476.92 | 1,732,155.56 | 39.75716634 | -80.67357438 |
| 13,799.97 | 89.00 | 150.32 | 6,420.12 | -6,467.97 | 5,288.45 | 14,438,390.05 | 1,732,205.07 | 39.75692730 | -80.67339933 |
| 13,899.97 | 89.00 | 150.32 | 6,421.87 | -6,554.83 | 5,337.96 | 14,438,303.19 | 1,732,254.59 | 39.75668825 | -80.67322428 |
| 13,999.97 | 89.00 | 150.32 | 6,423.62 | -6,641.69 | 5,387.48 | 14,438,216.32 | 1,732,304.10 | 39.75644920 | -80.67304923 |
| 14,021.80 | 89.00 | 150.32 | 6,424.00 | -6,660.65 | 5,398.28 | 14,438,197.36 | 1,732,314.91 | 39.75639702 | -80.67301102 |
| **PBHL/TD 14021.80 MD/6424.00 TVD** | | | | | | | | | |
| 14,021.81 | 89.00 | 150.32 | 6,424.00 | -6,660.66 | 5,398.29 | 14,438,197.36 | 1,732,314.91 | 39.75639700 | -80.67301100 |

| | | | |
|---|---|---|---|
| **Database:** | DB_Jul2216dt_v14 | **Local Co-ordinate Reference:** | Well Keith Stern S-12 HM (slot N) |
| **Company:** | Tug Hill Operating LLC | **TVD Reference:** | GL @ 744.00usft |
| **Project:** | Marshall County, West Virginia | **MD Reference:** | GL @ 744.00usft |
| **Site:** | Keith Stern | **North Reference:** | Grid |
| **Well:** | Keith Stern S-12 HM (slot N) | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Original Hole | | |
| **Design:** | rev1 | | |



**Design Targets**

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| LP Keith Stern S-12 HM<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 6,301.00 | -552.35 | 1,916.42 | 14,444,305.66 | 1,728,833.04 | 39.77320626 | -80.68532353 |
| LP Keith Stern S-12 HM<br>- plan misses target center by 51.82usft at 6958.46usft MD (6299.67 TVD, -525.38 N, 1900.64 E)<br>- Point | 0.00 | 0.00 | 6,301.00 | -552.35 | 1,856.42 | 14,444,305.66 | 1,728,773.04 | 39.77320684 | -80.68553708 |
| BHL Keith Stern S-12 HI<br>- plan hits target center<br>- Point | 0.00 | 0.01 | 6,424.00 | -6,660.66 | 5,398.29 | 14,438,197.36 | 1,732,314.91 | 39.75639700 | -80.67301100 |

**Plan Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates +N/-S (usft) | Local Coordinates +E/-W (usft) | Comment |
|---|---|---|---|---|
| 1,300.00 | 1,300.00 | 0.00 | 0.00 | KOP Begin 2°/100' build |
| 1,550.00 | 1,549.68 | -1.22 | 10.83 | Begin 5.00° tangent |
| 3,106.24 | 3,100.00 | -16.36 | 145.62 | Begin 3°/100' build/turn |
| 3,900.16 | 3,854.14 | -41.26 | 373.52 | Begin 28.82° tangent |
| 6,263.02 | 5,924.38 | -164.33 | 1,505.80 | Begin 10°/100' build/turn |
| 6,989.74 | 6,301.00 | -552.35 | 1,916.42 | Begin 89.00° lateral section |
| 14,021.80 | 6,424.00 | -6,660.65 | 5,398.28 | PBHL/TD 14021.80 MD/6424.00 TVD |

WW-6A
(9-13)

API NO. 47- 051 -
OPERATOR WELL NO. see attached list
Well Pad Name: Keith Stern

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

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

**Date of Notice:** 2/24/2021 **Date Permit Application Filed:** 2/25/2021

RECEIVED
Office of Oil and Gas
MAR 05 2021
WV Department of
Environmental Protection

**Notice of:**

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

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

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

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

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

☑ SURFACE OWNER(s)
Name: TH Exploration, LLC (Access Road and Well Pad)
Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15318
Name:
Address:

☐ SURFACE OWNER(s) (Road and/or Other Disturbance)
Name:
Address:
Name:
Address:

☐ SURFACE OWNER(s) (Impoundments or Pits)
Name:
Address:

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

☐ COAL OPERATOR
Name:
Address:

☑ SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
Name: *See attached list
Address:

☐ OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name:
Address:

*Please attach additional forms if necessary

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WW-6A
(8-13)

API NO. 47- 051 -
OPERATOR WELL NO. see attached list
Well Pad Name: Keith Stern

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Office of Oil and Gas
MAR 05 2021
WV Department of
Environmental Protection

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

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WW-6A
(8-13)

API NO. 47- 051 -
OPERATOR WELL NO. see attached list
Well Pad Name: Keith Stern

**Time Limits and Methods for Filing Comments.**

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

WW-6A
(8-13)

API NO. 47- 051 -
OPERATOR WELL NO. see attached list
Well Pad Name: Keith Stern

**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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

Commonwealth of Pennsylvania - Notary Seal
Susanne Deliere, Notary Public
Washington County
My commission expires January 15, 2025
Commission number 1382332
Member, Pennsylvania Association of Notaries

Subscribed and sworn before me this 23rd day of February, 2021

Susanne Deliere Notary Public

My Commission Expires 1/15/2025

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MAR 05 2021
WV Department of
Environmental Protection

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**WW-6A Notice of Application**
**Well Number Attachment**

Keith Stern N-1HM
Keith Stern N-2HM
Keith Stern N-3HM
Keith Stern N-4HM
Keith Stern N-5HM
Keith Stern N-6HM (47-051-02098)
Keith Stern N-7HM (47-051-02101)
Keith Stern S-8HM (47-051-02103)
Keith Stern S-9HM (47-051-02102)
Keith Stern S-10HM (47-051-02105)
Keith Stern S-12HM (47-051-02104)

**Exhibit WW-6A** **Supplement Pg. 1A**

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

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

Well: KEITH STERN S – 12HM
District: Meade (House #'s 1-5)
State: WV

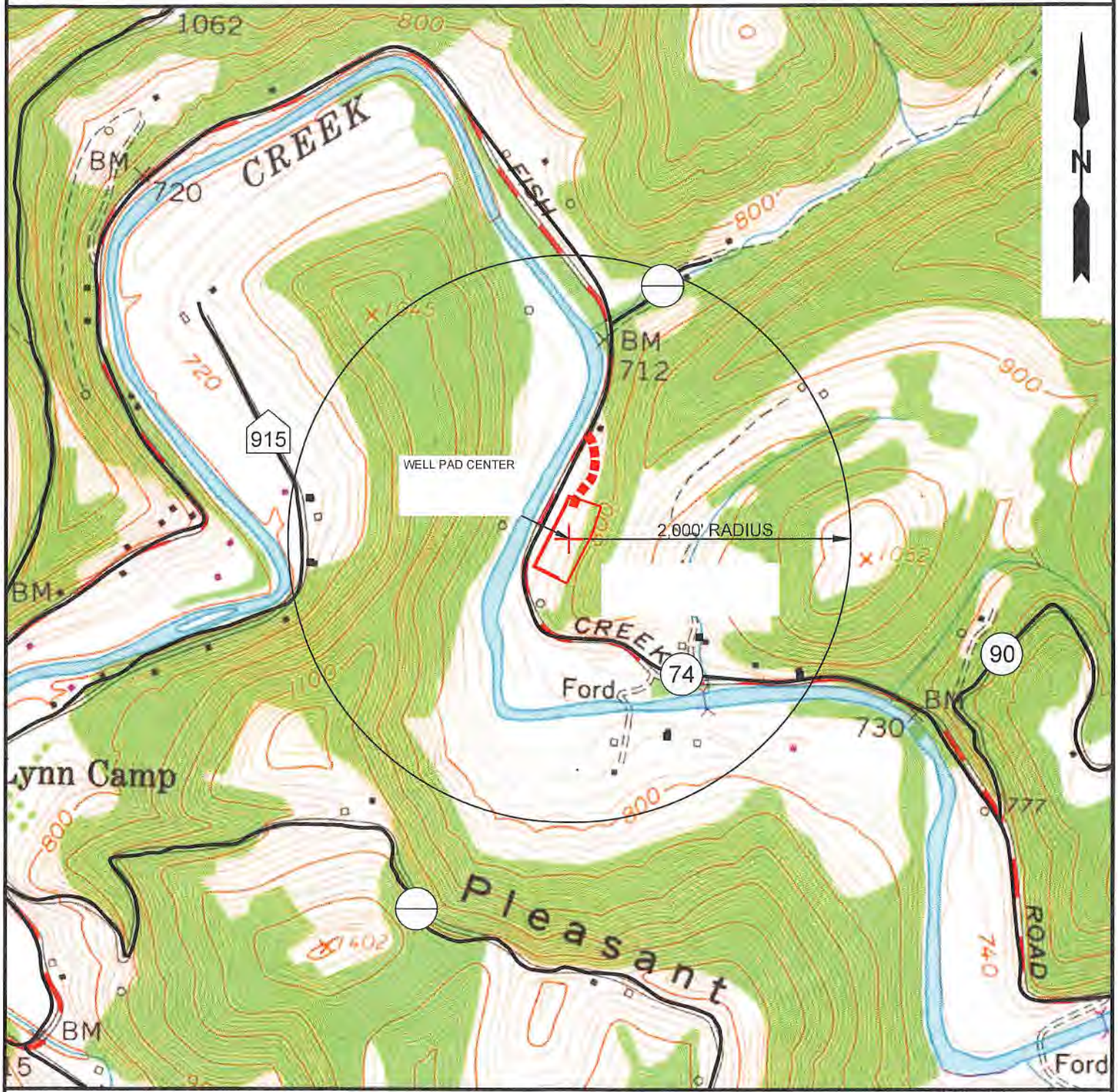
There are five (5) residences, no businesses, no churches, no schools or no emergency facilities within two-thousand feet (2,000') of the above referenced well location.

| | | |
|---|---|---|
| **House 1**<br>TM 14 Pcl. 20<br>William K. Stern, Et Ux<br>Phone: 304-843-1478 (Per Address – Keith, Betty & Ginger Sue Stern)<br>**Physical Address:**<br>14912 Fish Creek Rd.<br>Glen Easton, WV 26039<br>**Tax Address:**<br>Same | **House 2**<br>TM 14 Pcl. 20.1<br>William K. Stern, Et Ux<br>Phone: 304-843-1478 (Per Address – Keith, Betty & Ginger Sue Stern)<br>**Physical Address:**<br>15056 Fish Creek Rd.<br>Glen Easton, WV 26039<br>**Tax Address:**<br>14912 Fish Creek Rd.<br>Glen Easton, WV 26039 | **House 3**<br>TM 14 Pcl. 21<br>Eleanore M. Fox Est.<br>Phone: 304-845-6016 (Per Tax Address – Thomas Fox)<br>**Physical Address:**<br>None Found – Appears to be an old home.<br>**Tax Address:**<br>100 Lynn Camp Ln.<br>Glen Easton, WV 26039-9707 |
| **House 4**<br>TM 14 Pcl. 27<br>Patrick J. Shellhase<br>Phone: 304-845-0742; 304-810-0258<br>**Physical Address:**<br>593 Crow Dr.<br>Glen Easton, WV 26039<br>**Tax Address:**<br>2300 7th St.<br>Moundsville, WV 26041 | **House 5**<br>TM 14 Pcl. 25<br>Patricia A. Dugas<br>Phone: None Found<br>**Physical Address:**<br>681 Crow Dr.<br>Glen Easton, WV 26039<br>**Tax Address:**<br>Same | |

WW-6A

# PROPOSED
# KEITH STERN S - 12HM

SUPPLEMENT PG. 1B




NOTE: THERE APPEARS TO BE FIVE (5) POSSIBLE WATER SOURCES WITHIN 2,000'.

RECEIVED
Office of Oil & Gas
MAR 0 5 2021
WV Department of Environmental Protection

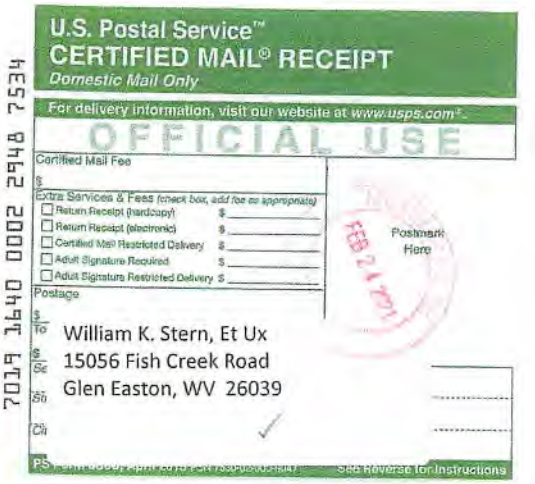
SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26351 • (304) 462-5634
www.slssurveys.com

| TOPO SECTION: | | OPERATOR: | |
|---|---|---|---|
| GLEN EASTON 7.5' | | PREPARED FOR: TUG HILL OPERATING, LLC<br>380 SOUTHPOINTE BLVD<br>SUITE 200<br>CANONSBURG, PA 15317 | |
| COUNTY | DISTRICT | | |
| MARSHALL | MEADE | | |
| DRAWN BY | JOB NO. | DATE | SCALE |
| K.G.M. | 8811 | 07/31/2018 | 1" – 1000' |

TUG HILL OPERATING

04/09/2021









04/09/2021