

west virginia department of environmental protection

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

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

Wednesday, February 5, 2020 WELL WORK PERMIT Horizontal 6A / New Drill

TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for KEITH STERN S-17HU 47-051-02266-00-00

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

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

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

James A. Martin

Operator's Well Number: KEITH STERN S-17HU

Farm Name: TH EXPLORATION, LLC

U.S. WELL NUMBER:

47-051-02266-00-00

Horizontal 6A New Drill

Date Issued: 2/5/2020

Promoting a healthy environment.

API Number: 47-051-02266

PERMIT CONDITIONS

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

CONDITIONS

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

API Number: 47-051-02266

PERMIT CONDITIONS

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



west virginia department of environmental protection

Oil and Gas Conservation Commission 601 57th Street SE, Charleston, WV 25304 304-926-0499 Ext 1274

Randall M. Albert, Chairman dep.wv.gov

December 18, 2019

Department of Environmental Protection Office of Oil and Gas Charleston, WV 25304

RE: Application for Deep Well Permit - API #47-051-02266

COMPANY: Tug Hill Operating, LLC

FARM: TH Exploration, LLC Keith Stern S-17HU

COUNTY: Marshall DISTRICT: Meade QUAD: Glen Easton

The deep well review of the application for the above company is <u>Approved to drill to Trenton for</u> Point Pleasant completion. Pooling Docket No. 290-289.

The applicant has complied with the provision of Chapter 22C-9, of the Code of West Virginia, nineteen hundred and thirty-one (1931), as amended, Oil and Gas Conservation Commission as follows:

- 1. Comments to Notice of Deviation filed? No
- 2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
- 3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: **yes; Docket 290-289 Exception Location Hearing
- 4. Provided a plat showing that the proposed location is a distance of <u>400+</u> feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

Susan Rose Administrator

^{**}Heaven Hill 3-6HU 47-051-01968; Heaven Hill 3-7HU 47-051-01969; Heaven Hill 2-6HU 47-051-01910; Heaven Hill 2-7HU 47-051-01911; Heaven Hill 2-8HU 47-051-01912; Heaven Hill 2W-12HU 47-051-01952; Heaven Hill 2W-13HU 47-051-01957; Keith Stern N-14HU 47-051-02252; Keith Stern N-15HU 47-051-02241; Keith Stern N-16HU 47-051-02242; Keith Stern N-19HU 47-051-02244; Keith Stern N-13HU 47-051-02269; Knob Creek N-12HU 47-051-02268; Knob Creek N-13HU 47-051-02269

| API NO. 47-051 - 051 | 2266 |
|----------------------|---------|
| OPERATOR WELL NO | |
| Well Pad Name: Keitl | h 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 Num | ber: Keith Stern S-17HL | J Well Pac | d Name: Keith | Stern | |
| 3) Farm Name/Surface C | owner: TH Exploration, | LLC Public Roa | nd Access: Fish | Creek Roa | ad (County Route 74) |
| 4) Elevation, current gro | und: <u>741.50'</u> El | evation, proposed | post-construction | on: 744.6 | 5' |
| 5) Well Type (a) Gas | <u>x</u> Oil | Und | erground Storag | ge | |
| Other | | | | | |
| (b)If Gas | Shallow | Deep | X | | |
| | Horizontal X | | | | |
| 6) Existing Pad: Yes or N | No No | | _ | | |
| , , | nation(s), Depth(s), Antic pth of 11,104' - 11,226' - thickness of 122' and anti | 1 | | ressure(s): | |
| | 44.070 | | | | |
| 8) Proposed Total Vertic | | | | | |
| 9) Formation at Total Ve | ertical Depth: I renton, | plug back to Ree | dsville | · | |
| 10) Proposed Total Meas | sured Depth: 18,954' | | | | |
| 11) Proposed Horizontal | Leg Length: 7,224.85 | | | | |
| 12) Approximate Fresh V | Water Strata Depths: | 70' ; 390' | | | |
| 13) Method to Determine | e Fresh Water Depths: | Offset well reports or no | oticeable flow at the | flowline or w | hen need to start soaping |
| 14) Approximate Saltwa | ter Depths: 1,740' | | | | |
| 15) Approximate Coal S | eam Depths: Sewickley | Coal - 304' ; Pitts | sburgh Coal - 3 | 397' | |
| 16) Approximate Depth | to Possible Void (coal mi | ine, karst, other): | none | | |
| 17) Does Proposed well directly overlying or adja | location contain coal sear | ns Yes | No | <u>x</u> | |
| (a) If Yes, provide Min | e Info: Name: | | | | |
| - | Depth: | | | | |
| | Seam: | | | | |
| | Owner: | | | | ************************************** |

4705 102266 API NO. 47-051

OPERATOR WELL NO. Keith Stern S-17HU

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 | 20" | NEW | J55 | 106.5# | 490' | 490' | 846 FT^3(CTS) |
| Coal | 13 3/8" | NEW | J55 | 54.5# | 2200' | 2200' | 1,559FT^3(CTS) |
| Intermediate | 9 5/8" | NEW | HPP110 | 47# | 10,134' | 10,134' | 3,283FT^3(CTS) |
| Production | 5 1/2" | NEW | P110 | 23# | 18,954' | 18,954' | 4,514FT^3(CTS) |
| Tubing | 2 7/8" | NEW | P110 | 6.5# | | 11,353' | |
| Liners | | | | | | | |



| ТҮРЕ | 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 | 20" | 26" | .5 | 2,410 | 1,928 | SEE # 24 | 1.2 |
| Coal | 13 3/8" | 17 1/2" | .38 | 2,740 | 2,192 | SEE #24 | 1.2 |
| Intermediate | 9 5/8" | 12 1/4" | .472 | 10,730 | 6,968 | SEE #24 | 1.99 |
| Production | 5 1/2" | 8 1/2" | .415 | 16,510 | 10,864 | SEE #24 | 1.18 |
| Tubing | 2 7/8" | | | 11,385 | 11,624 | | |
| Liners | | | | | | | |

PACKERS

| Kind: | N/A | RECEIVED Office of Oil and Gas |
|-------------|-----|---|
| Sizes: | N/A | AUG 27 2019 |
| Depths Set: | N/A | WV Department of Environmental Protectio |

WW-6B (10/14)

API NO. 47-457 Q 5 1 0 2 2 6 6

OPERATOR WELL NO. Keith Stern S-17HU

Well Pad Name: Keith Stern

75/1/19

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

Drill through the Point Pleasant and TD Pilot Hole 150' into the Trenton. 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 18,060,000 lb proppant and 279,221 bbl of water. Max rate = 80 bpm; max psi = 12,000#.

- 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 third joint. Production casing will have one centralizer every third joint in lateral, one centralizer every joint through curve, one centralizer every third 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 Gas POOH

AUG 27 2019

WV Department of Environmental Protection

*Note: Attach additional sheets as needed.

| FORMATION TOPS FORM | Condition Signature Sign | TOTAL TOTA | , 20" CSg @ 4990 MD/ 113 3/8" CSg @ 2,202' MD/ | 120' MD / 120' TVD | DISTRICT: Meade DF Elev. 10: 18,354' TD: 48,354' TH Lattude: 39,7747099 TH Longitude: -80,6911834 BH Latitude: 39,72237001 | GL Elev: 61 Elev: 01 | Marshall | | | | | | | | |
|--|--|--|---|--------------------|--|----------------------------|----------|---------------|----------------|---------------|-------------|------------|----------|--------------------|-------|
| 490'TVD Deepeth Trab Nature 350' Sewickley Coal 350' Sewickley Co | Dig ' Gg 60 TO Degree free whether Dig | 1399°CGG 100507 110507 | 130' CSg @ 490' MD / 133/8" CSg @ 2,202' MD / | | FORMATION TO | Sdi | | | | | CASING SUMI | MARY | | | |
| Sewideley Coal 397 Intermediate 26 20 450 450 Elitaburgh Coal 397 Intermediate 171/2 13/8 2,202" 2,200" Eleva 2,116" Floridution 8/1/2 13/8 2,202" 2,200" Floridurgh Coal 397 Intermediate 171/2 13/8 2,202" 2,200" Floridurgh Coal 397 Intermediate 171/2 13/8 2,202" 2,200" Floridurgh Coal 2,116" Floridurgh 1,1,205 Intermediate 3,267 A 15/6 Air Floridurgh Coal 11,205 Floridurgh 1,1,205 Floridurgh | Service Serv | Substance Subs | 13 3/8" Csg @ 2,202' MD/ | 490' TVD | Formation Deenest Fresh Water | - | | Type | Hole Size (in) | Csg Size (in) | Depth (MD) | | | Grade | 1 1 |
| Pittsburgh Coal 397 | Production 317 1712 1715 17 | Prediction 23/47 131/49 | 13 3/8" Csg @ 2,202'MD/ | | Sewickley Coal | | | Surface | 26 | 20 | 490, | 490, | 106.5 | 155 | 1 |
| 2,200 TVD Selframe 2,151 Total Lockport 8,122 Solds 10,134 Solds 9,582 Solds 10,134 Solds 9,582 Solds 10,134 Solds 9,582 Solds 10,134 Solds 9,582 Solds 10,134 Solds 11,138 Solds 11,138 Solds 11,138 Solds 11,138 Solds 11,138 Solds 11,138 Solds Air Solds 9,582 TVD Pilot Hole TD 11,336 Solds Production 3,967 A A 15 Ar Solds Air Solds | Finding Point But Not 1,1,25° Trun | 1336 Cgg 9 10.00 Tenton Top 11.25 Two 11.25 Tw | 133/8" Csg @ 2,202' MD / | | Pittsburgh Coal | 397' | 드 | itermediate 1 | 17 1/2 | 13 3/8 | 2,202, | 2,200' | 54.5 | JSS | |
| Berea 2,116" Production 81/2 51/2 18,954" 11,285" Tuliy 6,137" | 1,1,100 1,1, | 11,255 1 | 13.3/8" Csg @ 2,202' MD / | | Big Lime | 1,611' | E . | ntermediate 2 | 12 1/4 | 9 2/8 | 10,134 | 9,952' | 47 | HPP110 | |
| 2,200'TVD Salina 6,242* | 133/4" Cg 2,202 NO 2,200 TVD 2,001 Cg 2,31 | Tully 6,137 Conductor 318 Conductor Conductor 318 Conductor Conductor Conductor 318 Conductor Conduc | 13 3/8" Csg @ 2,202' MD / | | Berea | 2,116" | | Production | 8 1/2 | 5 1/2 | 18,954 | 11,285' | 23 | HCP110 | |
| 2,200'TVD Salina 6,233' Conductor 338 A 15.6 Air | 1336°Cg 2100°TUD | Marcellus 6,242 Condidação 6,359 Condidação 1,350 Condidação 1 | 13 3/8" Csg @ 2,202' MD / | | Tully | 6,137 | | | | | | | | | |
| 2,200°TVD Salina 7,038 Conductor 338 A 15.6 Air Cuckport 8,071° Utica 10,828° Conductor 338 A 15.6 Air Surface 908 A 15.6 Air Intermediate 1 1,689 A 15.6 Air Production 11,226° Production 3,967 A 15.5 Air Surface 998 A 15.6 Air Air Surface 11,226° Air Intermediate 2 2,821 A 14.5 Air SOBM Pilot Hole TD 11,376° Air Sobm A 15,26° Air Sobm A 15,26° Air Air Air Sobm A 15,26° Air | 1133/6°C46 2.200°TVD Salina 7.028 6.2397 Conductor 3.88 A 13.66 Air Salina 7.028 | 2,202 ND/ 2,200 TVO 2,200 | 13 3/8" Csg @ 2,202' MD / | | Marcellus | 6,242 | | | CEMENT SUMN | TARY | | | DRILLING | G DETAILS | |
| Salina 7,018' Conductor 338 A 15.6 Air Lockport 8,071' Surface 908 A 15.6 Air Lockport 11,104' Intermediate 1,689 A 15.6 Air Air Landing Depth 11,126' Production 3,967 A 15 Air / SOBM DASS3' ft MD | Salina 17,018 Conductor 338 A 15.6 Air | Salina 1788 Conductor 336 A 156 Ar 1568 Lockport 8,071 Sport Conductor 336 A 156 Ar 1 | 4,202 INID / | G. C. C. C. | Onondaga | 6,293 | | | Sacks | Class | Density | Fluid Type | | Centralizer No | tes |
| 9,952 TVD 9,952 TMD 1,024port 9,071' 9,041 | Lockport 8,071 Surface 908 A 15.6 Air | Lockport 8,071; Surface 908 A 15.6 Air | | 7,200 100 | Salina | 7,018 | | Conductor | 338 | A | 15.6 | Air | | None | |
| 9,952 TVD 9,0453 ft MD 9,0453 ft MD 9,0453 ft MD 9,0452 f | 10,356 Mol. 10,355 | Note 10,855° ft MD | | | Lockport | 8,071* | | Surface | 806 | A | 15.6 | Air | 3.0 | entralizers at eq | nald |
| 9,952 TVD 9,014 Pleasant 11,104 Production 3,967 A 14.5 Air Air/SOBM Air/SO | Compared to the control of the con | SSAF Care 10,555 from Landing Point Gasant 11,105 and 11,135 and 1 | | | Utica | 10,828" | 드 | Itermediate 1 | 1,689 | A | 15 | Air | П | . Centralizer ever | y oth |
| Landing Depth 11,159* Production 3,967 A 15 Alr/SOBM 9,952*TVD 9,853* ft MD | Landing Point GL/31 'Mp 9,952' TVD Landing Point GL/32 'TWD Landing Point GL/33' TMD 11,159' TWD Landing Point GL/33' TMD 11,159' TVD 11,159' TV | ##© 9952 TVD Landing Point @1,326 AM 10,553 ft MD Landing Point @1,326 AM 11,326 Production 3,967 A 15 AM / SoBM 10,553 ft MD Landing Point @1,231 MD / 11,159 TVD CONTRACTION TOPP CON | | | Point Pleasant | 11,104' | = | itermediate 2 | 2,821 | A | 14.5 | Air | 1 | . Centralizer ever | y oth |
| 9,952 TVD 9,853 ft MD | ## Soft Cop | Nonetian 3:467 A 1328 Arrobem 11.376 Production 3:467 A 135 Arrobem 10.353° Cag and arrow Trenton Top and arrobem 11.376 Arrob | | | Landing Depth | 11,159 | | | | | | | | int in lateral: 1 | oi ra |
| 9,952 TVD Pilot Hole TD 0,853 'ft MD | KOP © 10,553° ft.MD KOP © 10,553° ft.MD Landing Point @1,731° MD / 11,159° TVD PH PS = 160° bellow Trenton Top A 7 7 7 2 2 2 1 | Out 256, 9 % 25.7 % 6 % 00 % 25.7 % 6 % 00 % 25.7 % 6 % 00 % 25.8 % 6 % 25.8 % 25.8 % 6 % 25.8 % | | | Trenton | 11,226' | | Production | 3,967 | ¥ | 15 | Air / SOBM | | every other jt to | er jo |
| 9,952 | KOP © 10,553" ft MD KOP © 10,553" ft MD Landing Point Ø1,731" MD / 11,159" IVD HOP = 160" below Trenton Top O 7 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 7 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 7 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 7 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 7 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 8 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 8 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 8 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top O 8 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top Hop = 160" below Trenton Top Hop = 160" below Trenton Top O 8 2 2 2 Manage Point Ø1,731" MD / 11,159" IVD Hop = 160" below Trenton Top Hop = 160" below Trenton | ONLESS OF JOHN PETOL ONLESS OF | | | Pilot Hole TD | 11,376' | | | | | | | | | |
| | LEG BE ST. AM Trenton Top Total Wall 11,155/110 Total Wall Belon Trenton Top Wall Wall Belon Trenton Top Wall Wall Wall Wall Wall Wall Wall Wal | ONLISST'IT / OWITE/LD TO THE SEC PRIOR OF SE | 95/8" CSR @ 10,134' MD / KOP @ | 9,952 | | | | | | | | | , | | - |
| | Landing Point @1,731'MD / 11,158'170 ONT '821,111 / OM '161,121'MD / 11,158'170 ONT '921'MD / 11,158'MD / 11,158'M | PECEIVED Gass ANT 9821,11 / Jan 1732 in Mod graphing point of 1,321 in Mod graphing and Gass AUG 27 2019 | | | | | | | | | | | E | 1 h | 1 |
| | avrive in the print of the prin | avr. 857'11 / aw. 152'10 hold griphed and trenton Town Transport of the Carlo of Car | | | | | | | | | | | | | |



Tug Hill Operating, LLC Casing and Cement Program

Keith Stern S-17HU

| | | C | Casing | | |
|----------------|---------|--------|----------|------------------|----------------|
| | String | Grade | Bit Size | Depth (Measured) | Cement Fill Up |
| Conductor | 30" | BW | 36" | 120' | CTS |
| Surface | 20" | J55 | 26" | 490' | CTS |
| Intermediate 1 | 13 3/8" | J55 | 17 1/2" | 2,202' | CTS |
| Intermediate 2 | 9 5/8" | HPP110 | 12 1/4" | 10,134' | CTS |
| Production | 5 1/2" | HCP110 | 8 1/2" | 18,954' | CTS |

Cement

| Surface: | Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2 |
|-----------------|--|
| Intermediate 1: | Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.2 |
| Intermediate 2: | Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.99 |
| 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 = 1.18 |

RECEIVED Office of Oil and Gas

AUG 27 2019

WV Department of Environmental Protection



August 23, 2019

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

RE: Keith Stern S-17HU

Subject: Proposed Voluntary Pooling and Unitization

Dear Susan:

Tug Hill Operating, LLC is authorized through, either lease or other agreement, to unitize and pool all lands falling within

the boundaries of the proposed voluntary unit included with this submission, with the exception of the following tracts which we intend to force pool.

9-17-40

9-17-41

If your office has any questions or concerns regarding the contents of this letter, please do not hesitate to contact me

directly at 724-749-8388, or by email at amiller@tug-hillop.com.

Sincerely,

Amy L. Miller

Permitting Specialist - Appalachia Region

Tug Hill Operating

51-02266

Operator's Well No. Keith Stern S-17HU

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 DPS GIS (08/06/2018) 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
- 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 RECEIVED

 All Gas

WV Department of Environmental Protection

Page 1 of 6

Keith Stern S-17HU Wells within 500' Buffer

| API Number | Operator Name | Total Depth | Perforated Fms | Producing zones not perforated | inates. The spots may differ from those depict is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit! would assign to wells that might be within in range of fracture propagation | Comments |
|------------|-----------------------------------|-------------|-------------------|-----------------------------------|---|-------------------------------|
| | Wheeling Natural | | | | No, the well is not deep enough to be within the expected fracture propagation from a | |
| 4705100594 | Gas | 2,375' TVD | Gordon Sd | Unknown | Point Pleasant stimulation. | Well was producing as of 201. |
| 4705100726 | Hope Natural Gas Company | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents a shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | Well was producing as of 201: |
| 4705130406 | Unknown | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | Well was plugged 11/14/1959 |
| 4705130406 | Unknown | Officiown | Unknown | Unknown | No, the well is not deep enough to be within | Well was plugged 11/14/1955 |
| 4705130428 | Unknown | 2870' TVD | Gordon | Unknown | the expected fracture propagation from a Point Pleasant stimulation. The well is plugged | Well was plugged 10/24/1960 |
| 4705170733 | Haknous | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |
| 4/031/0/33 | VIINIUWII | CHKIIOWII | OTHER PROPERTY. | WIINIWALI | Uknown but unlikely. The well likely | orate records are incomplete |
| 4705170741 | Unknown | Unknown | Unknown | Unknown | represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |
| 4705170744 | Unknown | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |
| | | | | | Uknown but unlikely. The well likely | |
| 4705170745 | Unknown | Unknown | Unknown | Unknown | represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |
| 4705170748 | Unknown | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |
| 4705170780 | Unknown | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |
| 4705170781 | Manufacturers Light & Heat Co. | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |
| 4705170782 | Hope Natural Gas Company | Unknown | Unknown | Unknown | Uknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Point Pleasant well. | State records are incomplete |

Page 2 of 6

Office of Oil and Gas AUG 27 2019 WV Department of Environmental Protection

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Office of Oil and Gas

AUG 27 2019

WV Department of Environmental Protection

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Location in the County

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Office of Oil and Gas

AUG 27 2019

Environmental Protection

Well: County = \$1 Permit = 70781

Caston Information: County = \$10 Permit = 70781

Caston Information: County = \$10 Permit = 70781

There is no Reduce tree Location data for in ear and a family series of 1976 to 1976 to 1976 to 1976.

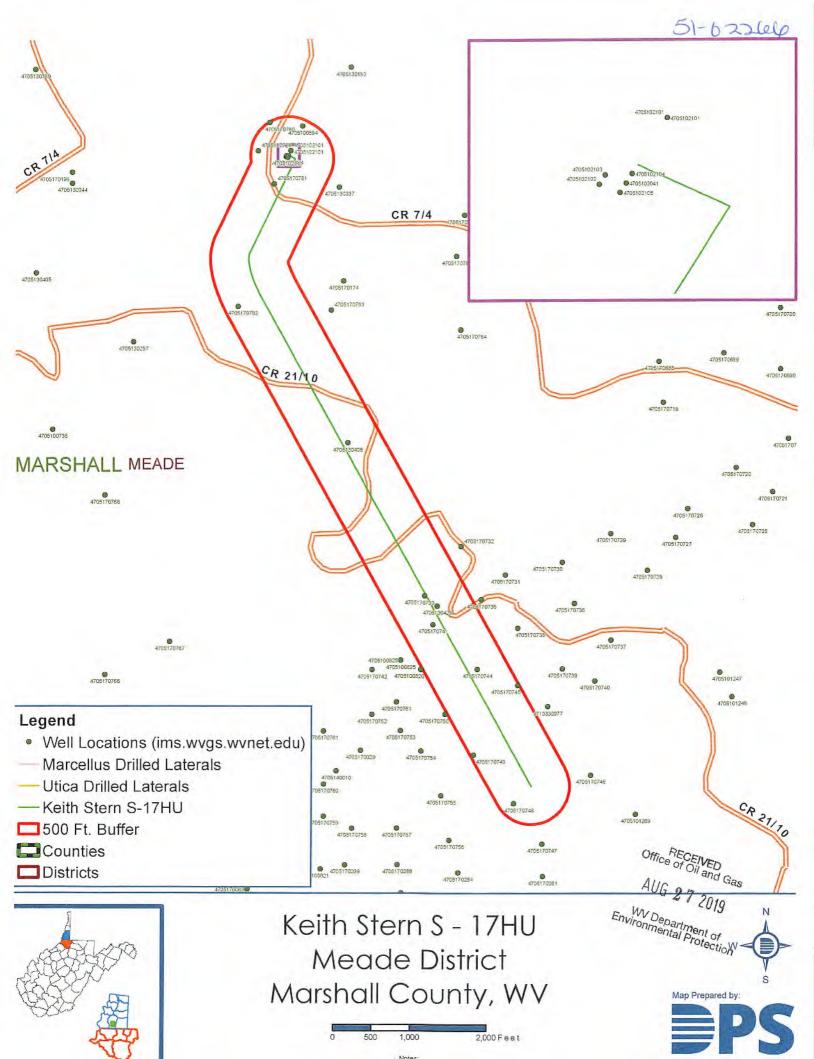
There is no Reduce tree Location data for in ear and a family series of 1976 to 197

Page 5 of 6

Office of Oil and Gas

AUG 27 2019

Environmental Protection





Database: Company: Project:

Site:

DB_Jul2216dt_v14 Tug Hill Operating LLC

Marshall County, West Virginia. Keith Stern

Well:

Keith Stern S-17 HU (slot O)

Original Hole Wellbore: Design: rev1

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Keith Stern S-17 HU (slot O)

GL @ 744.00usft GL @ 744.00usft

Grid

Minimum Curvature

Project

Marshall County, West Virginia.

Map System:

Universal Transverse Mercator (US Survey Feet)

Geo Datum:

NAD83 West Virginia - HARN

System Datum:

Mean Sea Level

Map Zone:

Zone 17N (84 W to 78 W)

Site Site Position: Keith Stern

From:

Lat/Long

+N/-S

Northing: Easting:

14,444,890.33 usft 1,726,932.47 usft

Latitude: Longitude: Grid Convergence:

39.77483004 -80.69208048

0.197

Position Uncertainty:

0.00 usft Slot Radius:

0.00 usft

14,444,868.79 usft

13-3/16 "

Latitude: Longitude:

39.77477099 -80.69211834

Position Uncertainty

Well Position

+E/-W 0.00 usft 0.00 usft

Keith Stern S-17 HU (slot O)

Northing: Easting:

1/18/2018

Wellhead Elevation:

1,726,921.91 usft Ground Level:

744.00 usft

Wellbore

Well

Original Hole

Model Name Magnetics

rev1

IGRF2015

Sample Date

Declination

Dip Angle

Field Strength (nT)

52,102.16431152

Design

Audit Notes:

Version:

Phase:

PLAN

Tie On Depth:

-8.713

0.00

66.896

Vertical Section:

Depth From (TVD) (usft) 0.00

+N/-S (usft) 0.00

+E/-W (usft) 0.00

Remarks

Direction (°) 158.72

Plan Survey Tool Program

4/2/2019

Depth From (usft)

Depth To

0.00

(usft) Survey (Wellbore)

18,954.39 rev1 (Original Hole)

Tool Name

MWD

MWD - Standard



Database: Company: Project: DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia.

Site: Keith Stern

Well:

Keith Stern S-17 HU (slot O)

Wellbore: Design: Original Hole rev1

Local Co-ordinate Reference:

TVD Reference:
MD Reference:
North Reference:

Survey Calculation Method:

Well Keith Stern S-17 HU (slot O)

GL @ 744.00usft GL @ 744.00usft

Grid

Minimum Curvature

| Measured Depth (usft) | Inclination (°) | Azimuth | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | TFO (°) | Target |
|-----------------------|-----------------|---------|-----------------------------|-----------------|-----------------|-------------------------------|------------------------------|-----------------------------|---------|---------------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | |
| 1,600.00 | 0.00 | 0.00 | 1,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | |
| 1,850.00 | 5.00 | 120.00 | 1,849.68 | -5.45 | 9.44 | 2.00 | 2.00 | 0.00 | 120.000 | |
| 2,700.00 | 5.00 | 120.00 | 2,696.45 | -42.49 | 73.60 | 0.00 | 0.00 | 0.00 | 0.000 | |
| 2,950.00 | 0.00 | 120.00 | 2,946.13 | -47.94 | 83.04 | 2.00 | -2.00 | 0.00 | 180,000 | |
| 6,203.87 | 0.00 | 120.00 | 6,200.00 | -47.94 | 83.04 | 0.00 | 0.00 | 0.00 | 120.000 | |
| 7,150.84 | 18.94 | 206.01 | 7,129.82 | -187.33 | 15.04 | 2.00 | 2.00 | 0.00 | 206.005 | |
| 10,853.40 | 18.94 | 206.01 | 10,631.93 | -1,267.39 | -511.87 | 0.00 | 0.00 | 0.00 | 0.000 | |
| 11,321.95 | 50.00 | 164.27 | 11,017.98 | -1,517.46 | -495.98 | 8.00 | 6.63 | -8.91 | -56.929 | |
| 11,730.85 | 89.00 | 150.77 | 11,159.00 | -1,861.32 | -347.33 | 10.00 | 9.54 | -3.30 | -20.893 | |
| 18,954,39 | 89.00 | 150.77 | 11,285.00 | -8,163.97 | 3,179.73 | 0.00 | 0.00 | 0.00 | 0.000 | BHL Keith Stern S-1 |

RECEIVED Office of Oil and Gas

AUG 27 2019

WV Department of Environmental Protection



Database: Company: Project: DB_Jul2216dt_v14
Tug Hill Operating LLC
Marshall County, West Virginia.

Site: Keith Stern

Well:

Keith Stern S-17 HU (slot O)

Wellbore: Original Hole
Design: rev1

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Keith Stern S-17 HU (slot O)

GL @ 744.00usft GL @ 744.00usft

Grid

Minimum Curvature

RECEIVED Gas

AUG 27 2019

| nned Survey | , | | | | | | | H | JG 2 7 2019 |
|--|------------------------------------|---------|-------------------|--------|--------|--------------------------|----------------|-------------|--|
| Measured Depth | Inclination | Azimuth | Vertical Depth | +N/-S | +E/-W | Map Northing | Map Easting | | V Department of Department of Departmental Protect |
| (usft) | (°) | (°) | (usft) | (usft) | (usft) | (usft) | (usft) | Latitude | Longitude |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80,692118 |
| 100.00 | 0.00 | 0.00 | 100.00 | 0,00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80,692118 |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80,692118 |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80.692118 |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80,692118 |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80.692118 |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80.692118 |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80.692118 |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 14,444,868.79 | 1,726,921.91 | 39.77477099 | -80.692118 |
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| | gin 2°/100' bui | | 44.5 | | | | | | |
| 1,700.00 | CHARLES CONTRACTOR | 120.00 | 1,699.98 | -0.87 | 1.51 | 14,444,867.92 | 1,726,923.42 | 39.77476858 | -80.692112 |
| 1,800.00 | | 120.00 | 1,799.83 | -3,49 | 6.04 | 14,444,865.30 | 1,726,927.95 | 39.77476135 | -80.692096 |
| 1,850.00 | | 120.00 | 1,849.68 | -5.45 | 9.44 | 14,444,863,34 | 1,726,931.35 | 39.77475593 | -80,692084 |
| | 00° tangent | 120.00 | 1,010.00 | | 4.1. | 1.11 / 1 / 1 / 1 / 1 / 1 | 11. 20100 1100 | | |
| 1,900.00 | Carried Services in the Service of | 120.00 | 1,899.49 | -7.63 | 13.21 | 14,444,861.16 | 1,726,935.12 | 39.77474991 | -80.692071 |
| 2,000.00 | | 120.00 | 1,999.11 | -11.99 | 20.76 | 14,444,856.80 | 1,726,942.67 | 39.77473788 | -80,692044 |
| 2,100.00 | | 120.00 | 2,098.73 | -16.34 | 28.31 | 14,444,852.44 | 1,726,950.22 | 39.77472584 | -80,692017 |
| 2,200.00 | | 120.00 | 2,198.35 | -20.70 | 35.86 | 14,444,848.09 | 1,726,957.76 | 39.77471380 | -80.691990 |
| 2,300.00 | | 120.00 | 2,297.97 | -25.06 | 43.41 | 14,444,843.73 | 1,726,965.31 | 39,77470176 | -80.691964 |
| 2,400.00 | | 120.00 | 2,397.59 | -29.42 | 50.95 | 14,444,839,37 | 1,726,972.86 | 39.77468972 | -80.691937 |
| 2,500.00 | | 120.00 | 2,497.20 | -33.78 | 58.50 | 14,444,835.01 | 1,726,980.41 | 39,77467768 | -80,691910 |
| 2,599.99 | | 120.00 | 2,596.82 | -38.13 | 66.05 | 14,444,830.65 | 1,726,987.96 | 39.77466564 | -80,691883 |
| 2,699.99 | | 120.00 | 2,696.44 | -42.49 | 73.60 | 14,444,826.30 | 1,726,995.50 | 39,77465360 | -80,691856 |
| 2,700.00 | | 120.00 | 2,696.45 | -42.49 | 73.60 | 14,444,826.30 | 1,726,995.50 | 39.77465360 | -80,691856 |
| | | 120.00 | 2,080.43 | -42.40 | 73.00 | 14,444,020.30 | 1,720,995.50 | 33.77403300 | -00.051050 |
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| 2,899.99 | | 120.00 | 2,896.13 | -47.72 | 82.66 | 14,444,821.06 | 1,727,004.57 | 39.77463915 | -80.691824 |
| 2,950.00 | | 120.00 | 2,946.13 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| | ertical hold | | 2 2 2 2 2 2 | | 2006 | | | | 20.201000 |
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| 3,099.99 | | 0.00 | 3,096.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,199.99 | | 0.00 | 3,196.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,299.99 | | 0.00 | 3,296.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,399.99 | | 0.00 | 3,396.12 | -47,94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,499.99 | | 0.00 | 3,496.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,599.99 | | 0.00 | 3,596.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,699.99 | | 0.00 | 3,696.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,799.99 | | 0.00 | 3,796.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80,691823 |
| 3,899.99 | | 0.00 | 3,896.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 3,999.99 | | 0.00 | 3,996.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 4,099.99 | | 0.00 | 4,096.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 4,199.99 | | 0.00 | 4,196.12 | -47,94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 4,299.99 | | 0.00 | 4,296.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80,691823 |
| 4,399.99 4,499.99 | | 0.00 | 4,396.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |
| 4 499 99 | 0.00 | 0.00 | 4,496.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.691823 |



Database: Company: Project:

Site:

DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia.

Keith Stern

Well: Keith Stern S-17 HU (slot O)

Wellbore: Original Hole
Design: rev1

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Keith Stern S-17 HU (slot O)
REGEIVED
REGEIVED
GL @ 744.00usft
Office of Oil and Gas

GL @ 744,000sft GL @ 744,00usft Grid Minimum Curvature

AUG 27 2019

WV Department of nvironmental Protection

| esign: | rev1 | | | | | | | Envi | ronmental Prote |
|-----------------------------|-----------------|---------|-----------------------------|-----------------|-----------------|---------------------------|--------------------------|-------------|-----------------|
| Planned Survey | | | | | | | | Litte | |
| 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 | 0.00 | 0.00 | 4,696.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80,691823 |
| 4,799.99 | 0.00 | 0.00 | 4,796.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80,691823 |
| 4,899.99 | 0.00 | 0.00 | 4,896.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80,691823 |
| 4,999.99 | 0.00 | 0.00 | 4,996.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39,77463854 | -80.691823 |
| 5,099.99 | 0.00 | 0.00 | 5,096.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,199.99 | 0.00 | 0.00 | 5,196.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39,77463854 | -80.69182 |
| 5,299.99 | 0.00 | 0.00 | 5,296.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,399.99 | 0.00 | 0.00 | 5,396.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,499.99 | 0.00 | 0.00 | 5,496.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,599.99 | 0.00 | 0.00 | 5,596.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,699.99 | 0.00 | 0.00 | 5,696.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,799.99 | 0.00 | 0.00 | 5,796.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,899.99 | 0.00 | 0.00 | 5,896.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 5,999.99 | 0.00 | 0.00 | 5,996.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 6,099.99 | 0.00 | 0.00 | 6,096.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39.77463854 | -80.69182 |
| 6,199.99 | 0.00 | 0.00 | 6,196.12 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39,77463854 | -80,69182 |
| 6,203.87 | 0.00 | 0.00 | 6,200.00 | -47.94 | 83.04 | 14,444,820.85 | 1,727,004.95 | 39,77463854 | -80.69182 |
| Begin 2° | 100' build | | | | | | | | |
| 6,299.99 | 1.92 | 206.01 | 6,296.10 | -49.39 | 82.33 | 14,444,819.40 | 1,727,004.24 | 39,77463457 | -80.69182 |
| 6,399,99 | 3.92 | 206.01 | 6,395.97 | -53,97 | 80,10 | 14,444,814.81 | 1,727,002.00 | 39,77462201 | -80.69183 |
| 6,499.99 | 5.92 | 206.01 | 6,495.59 | -61.68 | 76.33 | 14,444,807.10 | 1,726,998.24 | 39.77460087 | -80.69184 |
| 6,599.99 | 7.92 | 206.01 | 6,594.86 | -72.52 | 71.05 | 14,444,796.27 | 1,726,992.96 | 39.77457117 | -80.69186 |
| 6,699.99 | 9,92 | 206.01 | 6,693.64 | -86.46 | 64.25 | 14,444,782.33 | 1,726,986.16 | 39.77453296 | -80,69189 |
| 6,799.99 | 11.92 | 206.01 | 6,791.83 | -103,48 | 55.94 | 14,444,765.30 | 1,726,977.85 | 39,77448627 | -80.69192 |
| 6,899.99 | 13,92 | 206.01 | 6,889.29 | -123,58 | 46.14 | 14,444,745.21 | 1,726,968.05 | 39.77443117 | -80.69195 |
| 6,999.99 | 15.92 | 206.01 | 6,985.91 | -146.72 | 34.85 | 14,444,722.06 | 1,726,956.76 | 39.77436772 | -80.69199 |
| 7,099.99 | 17.92 | 206.01 | 7,081.57 | -172.88 | 22.09 | 14,444,695.90 | 1,726,943.99 | 39.77429600 | -80.69204 |
| 7,150.84 | 18.94 | 206.01 | 7,129.82 | -187.33 | 15.04 | 14,444,681.45 | 1,726,936.94 | 39.77425638 | -80,69206 |
| Begin 18 | .94° tangent | | | | | | | | |
| 7,199.99 | 18,94 | 206.01 | 7,176.30 | -201.67 | 8.04 | 14,444,667.12 | 1,726,929.95 | 39.77421708 | -80,69209 |
| 7,299.99 | 18,94 | 206.01 | 7,270.89 | -230.84 | -6.19 | 14,444,637.95 | 1,726,915.72 | 39,77413710 | -80,69214 |
| 7,399.99 | 18.94 | 206.01 | 7,365.48 | -260,01 | -20.42 | 14,444,608.78 | 1,726,901.49 | 39.77405713 | -80.69219 |
| 7,499.99 | 18.94 | 206.01 | 7,460.06 | -289.18 | -34.65 | 14,444,579.61 | 1,726,887.26 | 39.77397715 | -80,69224 |
| 7,599.98 | 18.94 | 206.01 | 7,554.65 | -318.35 | -48.88 | 14,444,550.44 | 1,726,873.03 | 39.77389718 | -80.69229 |
| 7,699.98 | 18.94 | 206.01 | 7,649.24 | -347.52 | -63.11 | 14,444,521.27 | 1,726,858.80 | 39.77381720 | -80.69234 |
| 7,799.98 | 18.94 | 206.01 | 7,743.82 | -376.69 | -77.34 | 14,444,492.10 | 1,726,844.57 | 39.77373722 | -80.69239 |
| 7,899.98 | 18.94 | 206.01 | 7,838.41 | -405.86 | -91.57 | 14,444,462.92 | 1,726,830.34 | 39.77365725 | -80.69244 |
| 7,999.98 | 18.94 | 206.01 | 7,932.99 | -435.03 | -105.80 | 14,444,433.75 | 1,726,816.10 | 39.77357727 | -80.69250 |
| 8,099.98 | 18.94 | 206.01 | 8,027.58 | -464.20 | -120.03 | 14,444,404.58 | 1,726,801.87 | 39.77349730 | -80.69255 |
| 8,199.98 | 18.94 | 206.01 | 8,122.17 | -493.38 | -134.26 | 14,444,375.41 | 1,726,787.64 | 39.77341732 | -80,69260 |
| 8,299.98 | 18.94 | 206.01 | 8,216.75 | -522.55 | -148.49 | 14,444,346.24 | 1,726,773.41 | 39,77333734 | -80.69265 |
| 8,399.98 | 18.94 | 206.01 | 8,311.34 | -551.72 | -162.72 | 14,444,317.07 | 1,726,759.18 | 39.77325737 | -80.69270 |
| 8,499.98 | 18.94 | 206.01 | 8,405.92 | -580.89 | -176.96 | 14,444,287,90 | 1,726,744.95 | 39.77317739 | -80.69275 |
| 8,599,98 | 18.94 | 206.01 | 8,500.51 | -610.06 | -191.19 | 14,444,258.73 | 1,726,730.72 | 39.77309742 | -80.69280 |
| 8,699.98 | 18,94 | 206.01 | 8,595.10 | -639.23 | -205,42 | 14,444,229.56 | 1,726,716.49 | 39,77301744 | -80.69285 |
| 8,799.98 | 18,94 | 206.01 | 8,689.68 | -668.40 | -219.65 | 14,444,200.39 | 1,726,702.26 | 39.77293746 | -80.69290 |
| 8,899.98 | 18.94 | 206.01 | 8,784.27 | -697.57 | -233,88 | 14,444,171.22 | 1,726,688.03 | 39.77285749 | -80.69295 |
| 8,999.98 | 18.94 | 206.01 | 8,878.85 | -726.74 | -248.11 | 14,444,142.05 | 1,726,673.80 | 39.77277751 | -80.69301 |
| 9,099.98 | 18.94 | 206.01 | 8,973.44 | -755.91 | -262.34 | 14,444,112.88 | 1,726,659,57 | 39,77269754 | -80.69306 |
| 9,199,98 | 18.94 | 206.01 | 9,068.03 | -785.08 | -276.57 | 14,444,083.71 | 1,726,645.34 | 39.77261756 | -80.69311 |
| 9,299,98 | 18.94 | 206.01 | 9,162.61 | -814.25 | -290.80 | 14,444,054.54 | 1,726,631.10 | 39.77253758 | -80.69316 |
| 9,399.98 | 18.94 | 206.01 | 9,257.20 | -843.42 | -305.03 | 14,444,025.37 | 1,726,616.87 | 39.77245761 | -80.69321 |
| 9,499.98 | 18.94 | 206.01 | 9,351.78 | -872.59 | -319.26 | 14,443,996.19 | 1,726,602.64 | 39.77237763 | -80,69326 |
| 9,599.98 | 18.94 | 206.01 | 9,446.37 | -901.76 | -333.49 | 14,443,967.02 | 1,726,588.41 | 39.77229766 | -80.69331 |



Database: Company: Project:

DB_Jul2216dt_v14

Tug Hill Operating LLC

Marshall County, West Virginia.

Site: Keith Stern

Well: Keith Stern S-17 HU (slot O)

Original Hole Wellbore: Design:

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Keith Stern S-17 HU (slot O)

GL @ 744.00usft

GL @ 744.00usft Grid

RECEIVED Office of Oil and Gas Minimum Curvature

AUG 27 2019

WV Department of rev1

| Moneyand | | | Vertical | | | Man | Мар | | |
|--|-----------------|------------------|-----------|-----------|---------|-----------------|-------------------------------|--------------|--------------------------|
| Measured Depth | Inclination | Azimuth | Depth | +N/-S | +E/-W | Map Northing | Easting | | |
| (usft) | (°) | (°) | (usft) | (usft) | (usft) | (usft) | (usft) | Latitude | Longitude |
| 9,699.98 | 18.94 | 206.01 | 9,540.96 | -930.93 | -347.72 | 14,443,937.85 | 1,726,574,18 | 39.77221768 | -80.693367 |
| 9,799.98 | 18.94 | 206.01 | 9,635,54 | -960.10 | -361.96 | 14,443,908.68 | 1,726,559.95 | 39.77213770 | -80.693418 |
| 9,899.98 | 18.94 | 206.01 | 9,730.13 | -989.28 | -376.19 | 14,443,879,51 | 1,726,545.72 | 39.77205773 | -80,693469 |
| 9,999.98 | 18.94 | 206.01 | 9,824.71 | -1,018.45 | -390.42 | 14,443,850.34 | 1,726,531.49 | 39.77197775 | -80,693520 |
| 10,099.98 | 18.94 | 206.01 | 9,919.30 | -1,047.62 | -404.65 | 14,443,821.17 | 1,726,517.26 | 39.77189777 | -80,693571 |
| 10,199.98 | 18.94 | 206.01 | 10,013.89 | -1,076.79 | -418.88 | 14,443,792.00 | 1,726,503.03 | 39.77181780 | -80,693622 |
| 10,299.98 | 18.94 | 206.01 | 10,108.47 | -1,105.96 | -433.11 | 14,443,762.83 | 1,726,488.80 | 39.77173782 | -80.693673 |
| 10,399.98 | 18.94 | 206.01 | 10,203.06 | -1,135.13 | -447.34 | 14,443,733.66 | 1,726,474.57 | 39.77165784 | -80.693724 |
| 10,499.98 | 18.94 | 206.01 | 10,297.64 | -1,164.30 | -461.57 | 14,443,704.49 | 1,726,460.34 | 39.77157787 | -80.693775 |
| 10,599.98 | 18.94 | 206.01 | 10,392.23 | -1,193.47 | -475.80 | 14,443,675.32 | 1,726,446.11 | 39.77149789 | -80.693826 |
| 10,699.98 | 18.94 | 206.01 | 10,486.82 | -1,222.64 | -490.03 | 14,443,646.15 | 1,726,431.87 | 39.77141791 | -80,693877 |
| 10,799.98 | 18.94 | 206.01 | 10,581.40 | -1,251.81 | -504.26 | 14,443,616.98 | 1,726,417.64 | 39.77133794 | -80,693928 |
| 10,853.40 | 18.94 | 206.01 | 10,631.93 | -1,267.39 | -511.86 | 14,443,601.39 | 1,726,410.04 | 39.77129521 | -80.693955 |
| Begin 8° | /100' build/tur | m | | | | | And the state of the state of | | |
| 10,899.98 | 21.20 | 197.34 | 10,675.69 | -1,282.23 | -517.69 | 14,443,586.56 | 1,726,404.22 | 39,77125452 | -80.693976 |
| 10,999.98 | 27.11 | 184.06 | 10,766.96 | -1,322.28 | -524.70 | 14,443,546.51 | 1,726,397.20 | 39.77114460 | -80.69400 |
| 11,099.98 | 33.84 | 175.48 | 10,853.14 | -1,372.85 | -524.12 | 14,443,495.94 | 1,726,397.78 | 39.77100572 | -80.694000 |
| 11,199.98 | 40.99 | 169.53 | 10,932.54 | -1,432.95 | -515.96 | 14,443,435.83 | 1,726,405.95 | 39.77084058 | -80.69397 |
| 11,299.98 | 48.36 | 165.10 | 11,003.62 | -1,501.42 | -500.37 | 14,443,367.36 | 1,726,421.53 | 39.77065240 | -80.69391 |
| 11,321.95 | 50.00 | 164.27 | 11,017.98 | -1,517.46 | -495.98 | 14,443,351.33 | 1,726,425.93 | 39.77060831 | -80.69390 |
| | | | 11,017.00 | -1,517.40 | -400,00 | 14,445,551.55 | 1,720,425.55 | 00.77000007 | -00.00000 |
| Begin 10 | | | 44 064 40 | 1 577 27 | 477 44 | 44 440 004 40 | 1 700 111 77 | 39.77044361 | 00 602021 |
| 11,399.98 | 57.34 | 160.97 | 11,064.18 | -1,577.37 | -477.14 | 14,443,291.42 | 1,726,444.77 | 39.77021685 | -80.69383 |
| 11,499.98 | 66.85 | 157.46 | 11,110.95 | -1,659.84 | -445.71 | 14,443,208.95 | 1,726,476.19 | | -80.693724 -80.693588 |
| 11,599.98 | 76.42 | 154.42 | 11,142.42 | -1,746.35 | -407.01 | 14,443,122.43 | 1,726,514.90 | 39.76997888 | |
| 11,699.98 | 86.03 89.00 | 151.61 150.77 | 11,157.66 | -1,834.30 | -362.19 | 14,443,034.49 | 1,726,559.72 | 39.76973695 | -80.693429 |
| 11,730.85 | | 130.77 | 11,159.00 | -1,861.32 | -347.33 | 14,443,007.47 | 1,726,574.58 | 39.76966259 | -80.693377 |
| The second secon | 0.00° lateral | 450 77 | 44 400 04 | 2 004 00 | | | | 20 720 (200) | |
| 11,799.98 | 89.00 | 150.77 | 11,160.21 | -1,921.63 | -313,58 | 14,442,947.15 | 1,726,608.33 | 39.76949664 | -80.69325 |
| 11,899.98 | 89.00 | 150.77 | 11,161.95 | -2,008.89 | -264,75 | 14,442,859.90 | 1,726,657.16 | 39.76925656 | -80,69308 |
| 11,999.98 | 89.00 | 150.77 | 11,163.69 | -2,096.14 | -215.92 | 14,442,772.65 | 1,726,705.99 | 39.76901649 | -80.692912 |
| 12,099.98 | 89.00 | 150.77 | 11,165.44 | -2,183.39 | -167.09 | 14,442,685.40 | 1,726,754.81 | 39.76877641 | -80.692739 |
| 12,199.98 | 89.00 | 150.77 | 11,167.18 | -2,270.64 | -118.27 | 14,442,598.15 | 1,726,803.64 | 39.76853634 | -80.692567 |
| 12,299,98 | 89.00 | 150.77 | 11,168.93 | -2,357.89 | -69.44 | 14,442,510.90 | 1,726,852.47 | 39.76829626 | -80.692394 |
| 12,399.98 | 89.00 | 150.77 | 11,170.67 | -2,445.14 | -20.61 | 14,442,423.65 | 1,726,901.29 | 39.76805618 | -80.69222 |
| 12,499.98 | 89.00 | 150.77 | 11,172.42 | -2,532.39 | 28.21 | 14,442,336.39 | 1,726,950.12 | 39.76781611 | -80.692048 |
| 12,599.98 | 89.00 | 150.77 | 11,174.16 | -2,619.65 | 77.04 | 14,442,249.14 | 1,726,998.95 | 39,76757603 | -80.691876 |
| 12,699.97 | 89.00 | 150.77 | 11,175.90 | -2,706.90 | 125.87 | 14,442,161.89 | 1,727,047.78 | 39.76733595 | -80.691703 |
| 12,799,97 | 89.00 | 150.77 | 11,177.65 | -2,794.15 | 174.70 | 14,442,074.64 | 1,727,096.60 | 39.76709588 | -80.691530 |
| 12,899.97 | 89,00 | 150.77 | 11,179.39 | -2,881.40 | 223,52 | 14,441,987.39 | 1,727,145.43 | 39.76685580 | -80.691358 |
| 12,999.97 | 89,00 | 150.77 | 11,181.14 | -2,968.65 | 272.35 | 14,441,900.14 | 1,727,194.26 | 39.76661572 | -80,69118 |
| 13,099.97 | 89.00 | 150.77 | 11,182.88 | -3,055.90 | 321.18 | 14,441,812.89 | 1,727,243.08 | 39.76637564 | -80.691012 |
| 13,199.97 | 89.00 | 150.77 | 11,184.63 | -3,143.15 | 370.01 | 14,441,725.63 | 1,727,291.91 | 39.76613556 | -80.690840 |
| 13,299.97 | 89.00 | 150.77 | 11,186.37 | -3,230.41 | 418.83 | 14,441,638.38 | 1,727,340.74 | 39.76589549 | -80.690667 |
| 13,399.97 | 89.00 | 150.77 | 11,188.11 | -3,317.66 | 467.66 | 14,441,551.13 | 1,727,389.57 | 39.76565541 | -80.690494 |
| 13,499.97 | 89.00 | 150.77 | 11,189.86 | -3,404.91 | 516.49 | 14,441,463.88 | 1,727,438.39 | 39.76541533 | -80.690322 |
| 13,599.97 | 89.00 | 150.77 | 11,191.60 | -3,492.16 | 565.31 | 14,441,376.63 | 1,727,487.22 | 39.76517525 | -80.690149 |
| 13,699.97 | 89.00 | 150.77 | 11,193.35 | -3,579.41 | 614.14 | 14,441,289.38 | 1,727,536.05 | 39.76493517 | -80.689976 |
| 13,799.97 | 89.00 | 150.77 | 11,195.09 | -3,666.66 | 662.97 | 14,441,202.12 | 1,727,584.87 | 39.76469509 | -80.689803 |
| 13,899.97 | 89.00 | 150.77 | 11,196.84 | -3,753.91 | 711.80 | 14,441,114.87 | 1,727,633.70 | 39.76445501 | -80,689631 |
| 13,999.97 | 89.00 | 150.77 | 11,198.58 | -3,841.17 | 760.62 | 14,441,027.62 | 1,727,682.53 | 39.76421493 | -80.689458 |
| 14,099.97 | 89.00 | 150.77 | 11,200.32 | -3,928.42 | 809.45 | 14,440,940.37 | 1,727,731.36 | 39.76397485 | -80.689285 |
| 14,199,97 | 89.00 | 150,77 | 11,202.07 | -4,015.67 | 858.28 | 14,440,853.12 | 1,727,780,18 | 39.76373477 | -80.689113 |
| 14,299.97 | 89.00 | 150.77 | 11,203.81 | -4,102.92 | 907.10 | 14,440,765.87 | 1,727,829.01 | 39.76349469 | -80.688940 |
| 14,399,97 | 89.00 | 150.77 | 11,205.56 | -4,190.17 | 955.93 | 14,440,678.62 | 1,727,877.84 | 39.76325460 | -80,688767 |



Database: Company: Project: DB_Jul2216dt_v14
Tug Hill Operating LLC
Marshall County, West Virginia.

Site: Keith Stern

Well:

Keith Stern S-17 HU (slot O) Original Hole

Wellbore: Design:

rev1

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Keith Stern S-17 HU (slot O)

GL @ 744.00usft GL @ 744.00usft

Grid

Minimum Curvature

| nned Survey | | | | | | | | | |
|-------------------|-------------|---------|-------------------|-----------|----------|-----------------|----------------|-------------|------------|
| Measured Depth | Inclination | Azimuth | Vertical Depth | +N/-S | +E/-W | Map Northing | Map Easting | | |
| (usft) | (°) | (°) | (usft) | (usft) | (usft) | (usft) | (usft) | Latitude | Longitude |
| 14,499.97 | 89.00 | 150.77 | 11,207.30 | -4,277.42 | 1,004.76 | 14,440,591.36 | 1,727,926.67 | 39.76301452 | -80.688595 |
| 14,599.97 | 89.00 | 150.77 | 11,209.05 | -4,364.68 | 1,053.59 | 14,440,504.11 | 1,727,975.49 | 39,76277444 | -80,688422 |
| 14,699.97 | 89.00 | 150.77 | 11,210.79 | -4,451.93 | 1,102.41 | 14,440,416.86 | 1,728,024.32 | 39.76253436 | -80,688249 |
| 14,799.97 | 89.00 | 150.77 | 11,212.53 | -4,539.18 | 1,151.24 | 14,440,329.61 | 1,728,073.15 | 39.76229428 | -80,68807 |
| 14,899.97 | 89.00 | 150.77 | 11,214.28 | -4,626.43 | 1,200.07 | 14,440,242.36 | 1,728,121.97 | 39.76205419 | -80.68790 |
| 14,999.97 | 89.00 | 150.77 | 11,216.02 | -4,713.68 | 1,248.90 | 14,440,155.11 | 1,728,170.80 | 39.76181411 | -80.68773 |
| 15,099.97 | 89.00 | 150.77 | 11,217.77 | -4,800.93 | 1,297.72 | 14,440,067.86 | 1,728,219.63 | 39.76157403 | -80.68755 |
| 15,199.97 | 89.00 | 150.77 | 11,219.51 | -4,888.18 | 1,346.55 | 14,439,980.60 | 1,728,268.46 | 39.76133394 | -80.68738 |
| 15,299.97 | 89.00 | 150.77 | 11,221,26 | -4,975.44 | 1,395.38 | 14,439,893.35 | 1,728,317.28 | 39.76109386 | -80.68721 |
| 15,399.97 | 89.00 | 150.77 | 11,223.00 | -5,062.69 | 1,444.20 | 14,439,806.10 | 1,728,366.11 | 39.76085377 | -80,68704 |
| 15,499.97 | 89.00 | 150.77 | 11,224.74 | -5,149.94 | 1,493.03 | 14,439,718.85 | 1,728,414.94 | 39.76061369 | -80.68686 |
| 15,599.97 | 89.00 | 150.77 | 11,226.49 | -5,237.19 | 1,541.86 | 14,439,631.60 | 1,728,463.76 | 39,76037361 | -80.68669 |
| 15,699.97 | 89.00 | 150.77 | 11,228.23 | -5,324.44 | 1,590.69 | 14,439,544.35 | 1,728,512.59 | 39.76013352 | -80.68652 |
| 15,799.97 | 89.00 | 150.77 | 11,229.98 | -5,411.69 | 1,639.51 | 14,439,457.10 | 1,728,561.42 | 39.75989344 | -80.68635 |
| 15,899.97 | 89.00 | 150.77 | 11,231.72 | -5,498.94 | 1,688,34 | 14,439,369.84 | 1,728,610,25 | 39.75965335 | -80,68617 |
| 15,999.97 | 89.00 | 150,77 | 11,233.47 | -5,586.20 | 1,737.17 | 14,439,282,59 | 1,728,659.07 | 39.75941326 | -80.68600 |
| 16,099.97 | 89.00 | 150.77 | 11,235,21 | -5,673.45 | 1,785.99 | 14,439,195.34 | 1,728,707.90 | 39.75917318 | -80,68583 |
| 16,199.97 | 89.00 | 150.77 | 11,236.95 | -5,760.70 | 1,834.82 | 14,439,108.09 | 1,728,756.73 | 39.75893309 | -80.68566 |
| 16,299.97 | 89.00 | 150.77 | 11,238.70 | -5,847.95 | 1,883.65 | 14,439,020.84 | 1,728,805.56 | 39.75869301 | -80.68548 |
| 16,399.97 | 89.00 | 150.77 | 11,240.44 | -5,935.20 | 1,932.48 | 14,438,933.59 | 1,728,854.38 | 39.75845292 | -80.68531 |
| 16,499.97 | 89.00 | 150.77 | 11,242.19 | -6,022.45 | 1,981.30 | 14,438,846.33 | 1,728,903.21 | 39.75821283 | -80.68514 |
| 16,599.97 | 89.00 | 150.77 | 11,243.93 | -6,109.70 | 2,030.13 | 14,438,759.08 | 1,728,952.04 | 39.75797275 | -80.68496 |
| 16,699.97 | 89.00 | 150.77 | 11,245.68 | -6,196.96 | 2,078.96 | 14,438,671.83 | 1,729,000.86 | 39.75773266 | -80.68479 |
| 16,799.97 | 89.00 | 150.77 | 11,247.42 | -6,284.21 | 2,127.79 | 14,438,584.58 | 1,729,049.69 | 39.75749257 | -80.68462 |
| 16,899.97 | 89.00 | 150.77 | 11,249.17 | -6,371.46 | 2,176.61 | 14,438,497.33 | 1,729,098.52 | 39.75725248 | -80,68445 |
| 16,999.97 | 89.00 | 150.77 | 11,250.91 | -6,458.71 | 2,225.44 | 14,438,410.08 | 1,729,147.35 | 39.75701239 | -80.68427 |
| 17,099.97 | 89.00 | 150.77 | 11,252.65 | -6,545.96 | 2,274.27 | 14,438,322.83 | 1,729,196.17 | 39.75677231 | -80.68410 |
| 17,199.97 | 89.00 | 150.77 | 11,254.40 | -6,633.21 | 2,323.09 | 14,438,235.57 | 1,729,245.00 | 39.75653222 | -80.68393 |
| 17,299.97 | 89.00 | 150.77 | 11,256.14 | -6,720.47 | 2,371.92 | 14,438,148.32 | 1,729,293.83 | 39.75629213 | -80,68376 |
| 17,399.97 | 89.00 | 150.77 | 11,257.89 | -6,807.72 | 2,420.75 | 14,438,061.07 | 1,729,342.65 | 39.75605204 | -80.68358 |
| 17,499.97 | 89.00 | 150.77 | 11,259.63 | -6,894.97 | 2,469.58 | 14,437,973.82 | 1,729,391.48 | 39.75581195 | -80,68341 |
| 17,599.97 | 89.00 | 150.77 | 11,261.38 | -6,982.22 | 2,518.40 | 14,437,886.57 | 1,729,440.31 | 39.75557186 | -80.68324 |
| 17,699.96 | 89.00 | 150.77 | 11,263,12 | -7,069.47 | 2,567.23 | 14,437,799,32 | 1,729,489.14 | 39,75533177 | -80.68307 |
| 17,799.96 | 89.00 | 150.77 | 11,264.86 | -7,156.72 | 2,616.06 | 14,437,712.07 | 1,729,537.96 | 39.75509168 | -80.68289 |
| 17,899.96 | 89.00 | 150.77 | 11,266.61 | -7,243.97 | 2,664.88 | 14,437,624.81 | 1,729,586.79 | 39,75485159 | -80,68272 |
| 17,999.96 | 89.00 | 150.77 | 11,268.35 | -7,331.23 | 2,713.71 | 14,437,537.56 | 1,729,635.62 | 39.75461150 | -80.68255 |
| 18,099.96 | 89.00 | 150.77 | 11,270.10 | -7,418.48 | 2,762.54 | 14,437,450.31 | 1,729,684.45 | 39.75437141 | -80,68237 |
| 18,199.96 | 89.00 | 150.77 | 11,271.84 | -7,505.73 | 2,811.37 | 14,437,363.06 | 1,729,733.27 | 39.75413131 | -80.68220 |
| 18,299.96 | 89.00 | 150.77 | 11,273.59 | -7,592.98 | 2,860.19 | 14,437,275.81 | 1,729,782.10 | 39.75389122 | -80,68203 |
| 18,399.96 | 89.00 | 150.77 | 11,275.33 | -7,680.23 | 2,909.02 | 14,437,188.56 | 1,729,830.93 | 39.75365113 | -80.68186 |
| 18,499.96 | 89.00 | 150.77 | 11,277.07 | -7,767.48 | 2,957.85 | 14,437,101.31 | 1,729,879.75 | 39.75341104 | -80.68168 |
| 18,599.96 | 89.00 | 150.77 | 11,278.82 | -7,854.73 | 3,006.68 | 14,437,014.05 | 1,729,928.58 | 39.75317095 | -80.68151 |
| 18,699.96 | 89.00 | 150.77 | 11,280.56 | -7,941.99 | 3,055.50 | 14,436,926.80 | 1,729,977.41 | 39.75293085 | -80.68134 |
| 18,799.96 | 89.00 | 150.77 | 11,282.31 | -8,029.24 | 3,104.33 | 14,436,839.55 | 1,730,026.24 | 39.75269076 | -80.68117 |
| 18,899.96 | 89.00 | 150.77 | 11,284.05 | -8,116.49 | 3,153.16 | 14,436,752.30 | 1,730,075.06 | 39.75245067 | -80.68099 |
| 18,954.38 | 89.00 | 150.77 | 11,285.00 | -8,163.97 | 3,179.73 | 14,436,704.82 | 1,730,101.63 | 39,75232001 | -80,68090 |

Office of Oil and Gas

AUG 27 2019

WW Department of Environmental Protection



Database: Company: DB_Jul2216dt_v14
Tug Hill Operating LLC
Marshall County, West Virginia.

Project: Site:

Keith Stern

Original Hole

rev1

Well:

Keith Stern S-17 HU (slot O)

Wellbore: Design: Local Co-ordinate Reference:

TVD Reference: MD Reference:

North Reference: Survey Calculation Method: Well Keith Stern S-17 HU (slot O)

GL @ 744.00usft GL @ 744.00usft

Grid

Minimum Curvature

| 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-17 HU - plan misses target - Point | 0.00 center by 0.09 | 0.01 Jusft at 1173 | 11,159.00 30.81usft MD | -1,861.24 (11159.00 TV | -347.27 D, -1861.29 N | 14,443,007.54 , -347.35 E) | 1,726,574.64 | 39.76966280 | -80.69337697 |
| LP Keith Stern S-17 HU - plan misses target - Point | 0.00 center by 43.7 | | 11,159.00 '06.73usft Mi | -1,861.24 D (11158.09 TV | -397.27 VD, -1840.22 | 14,443,007.54 N, -358.97 E) | 1,726,524.63 | 39.76966327 | -80.69355492 |
| BHL Keith Stern S-17 HI - plan hits target cen - Point | | 0.01 | 11,285.00 | -8,163.97 | 3,179.73 | 14,436,704.81 | 1,730,101.64 | 39.75232000 | -80,68090500 |

| an Annotations | | | | | | |
|-----------------|-------|-----------------|-----------------|-----------------|----------------------------------|--|
| Measure | d V | ertical | Local Coor | dinates | | |
| Depth (usft) | | Depth (usft) | +N/-S (usft) | +E/-W (usft) | Comment | |
| 1,600 | .00 | 1,600.00 | 0.00 | 0.00 | KOP Begin 2°/100' build | |
| 1,850 | .00 | 1,849.68 | -5.45 | 9.44 | Begin 5.00° tangent | |
| 2,700 | .00 | 2,696.45 | -42.49 | 73.60 | Begin 2°/100' drop | |
| 2,950 | .00 | 2,946.13 | -47.94 | 83.04 | Begin vertical hold | |
| 6,203 | .87 | 6,200.00 | -47.94 | 83.04 | Begin 2°/100' build | |
| 7,150 | .84 | 7,129.82 | -187.33 | 15.04 | Begin 18.94° tangent | |
| 10,853 | .40 1 | 0,631.93 | -1,267.39 | -511.86 | Begin 8°/100' build/turn | |
| 11,321 | .95 1 | 1,017.98 | -1,517.46 | -495.98 | Begin 10°/100' build/turn | |
| 11,730 | .85 1 | 1,159.00 | -1,861.32 | -347.33 | Begin 89.00° lateral | |
| 18,954 | .38 1 | 1,285.00 | -8,163.97 | 3,179.73 | PBHL/TD 18954.38 MD/11285.00 TVD | |

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WV Department of Environmental Protection WW-9 (4/16)

API Number 47 - 051 -

Operator's Well No. Keith Stern S-17HU

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

| Operator Name Tug Hill Operating, LLC | OP Code 494510851 |
|--|---|
| Watershed (HUC 10) Fish Creek | Quadrangle Glen Easton 7.5' |
| Do you anticipate using more than 5,000 bbls of water to | o complete the proposed well work? Yes V No |
| Will a pit be used? Yes No | |
| If so, please describe anticipated pit waste: AS | ST Tanks with proper containment will be used for staging fresh water for frac and flow back water |
| Will a synthetic liner be used in the pit? Yes _ | No If so, what ml.? AST Tanks will be used with proper contained. |
| Proposed Disposal Method For Treated Pit Was | stes: |
| Land Application | |
| Underground Injection (UIC Reuse (at API Number | Permit Number_ UIC 2459, UIC 965, UIC 359, UIC 2D0732540, UIC 2D0732523 |
| | m WW-9 for disposal location) |
| Other (Explain_ | |
| No. 2 Con 2 Con and an arrange of the control of th | |
| Will closed loop system be used? If so, describe: Yes- | For Vertical and Horizontal Drilling |
| Drilling medium anticipated for this well (vertical and he | orizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal |
| -If oil based, what type? Synthetic, petroleum, | etc. Synthetic Oil Base |
| Additives to be used in drilling medium? Barite for weigh | ıt. |
| Drill cuttings disposal method? Leave in pit, landfill, rer | moved offsite, etc. All drill cuttings to be disposed of in a Landfill |
| -If left in pit and plan to solidify what medium v | will be used? (cement, lime, sawdust) N/A |
| -Landfill or offsite name/permit number? Wetzel C | County Sanitary Landfil (SWF-1021 / WV0109185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1388426) |
| | I and Gas of any load of drill cuttings or associated waste rejected at any ovided within 24 hours of rejection and the permittee shall also disclose |
| on August 1, 2005, by the Office of Oil and Gas of the W provisions of the permit are enforceable by law. Violat law or regulation can lead to enforcement action. I certify under penalty of law that I have persapplication form and all attachments thereto and that obtaining the information, I believe that the information penalties for submitting false information, including the | is and conditions of the GENERAL WATER POLLUTION PERMIT issued Vest Virginia Department of Environmental Protection. I understand that the tions of any term or condition of the general permit and/or other applicable sonally examined and am familiar with the information submitted on this is, based on my inquiry of those individuals immediately responsible for on is true, accurate, and complete. I am aware that there are significant possibility of fine or imprisonment. |
| 40 | mcake |
| Company Official (Typed Name) Jim Pancake | RECEIVED GO |
| Company Official Title Vice President Geoscience | Office of Oil and ou |
| | AUG 2 7 2019 |
| Subscribed and sworn before me this 30 day | y of ARRIL , 20 19 |
| Masween & Stead | Notary Public monwealth of Penrsyvania - Notary Seal MAUREEN A STEAD - Notary Public |
| My commission amin 1/20/20 | MAUREEN A STEAD - Notary Public Washington County |
| My commission expires 1/28/23 | My Commission Expires Jan 28, 2023 Commission Number 1259926 |

Operator's Well No. Keith Stern S-17HU

| Fertilizer type 10-20-20 Fertilizer amount 500 lbs/acre Mulch 2.5 Tons/acre Seed Mixtures | |
|--|--|
| Fertilizer amount 500 lbs/acre Mulch 2.5 Tons/acre | |
| Mulch 2.5 Tons/acre | |
| | |
| Seed Mixtures | |
| | |
| Temporary | rmanent |
| Seed Type Ibs/acre Seed Type Annual Ryegrass 40 Orchard Grass | lbs/acre 12 |
| Spring Oats 96 Ladino | 3 |
| White Clover | 2 |
| Plan Approved by: July Unline | |
| | |
| Comments: | RECEIVE |
| | RECEIVED Office of Oil an |
| Comments: Title: Oil and Gas Inspector Date: 5/1/17 | RECEIVER Office of Oil and AUG 27 WV Departs Environmental |

WW-9

PROPOSED KEITH STERN S - 17HU

STOCKPILE

7008001

SUPPLEMENT PG. 1

NOTES:

- O DENOTES INSTALL 18" PVC CULVERT AND APPLY APPROPRIATE SEDIMENT CUTLET CONTROL (RIP RAP SPLASH PAD)
- REFERENCE IS HEREBY MADE TO THE WY D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS
- 4. INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD
- 5. ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.
- 6. TEMPORARILY SEED AND MULCH ALL SLOPS UPON CONSTRUCTION
- 7. ALL CUT AND FILL SLOPES ARE 2H: 1V SLOPE.
- 8. ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO BE UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.
- 9. SEE KEITH STERN S SITE PLAN PREPARED BY KELLEY SURVEYING, FOR COMPLETE CONSTRUCTION & EROSION AND SEDIMENT CONTROL DETAILS.

@ 0-5% GRADE

@ 5-10% GRADE 60' 170' @ 10-15% GRADE

20' @ 5-10% GRADE

@ 0-5% GRADE 300'

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WV Department of Environmental Protection SILT FENCE AND/OR SEDIMENT AND

EROSION CONTROL MEASURE



Solutions from the ground up.

P.O. Box 150 •12 Vanhorn Drive • Glenville, WV 26351 •(304) 462-5634 www.slssurveys.com

| TOPO SE | CTION: | OPERAT | OR: |
|----------|-----------|--------------------------------|------------|
| GLEN EA | STON 7.5' | PREPARED FOR: TUG HILL OPER | ATING, LLC |
| COUNTY | DISTRICT | 380 SOUTHPOIN | TE BLVD |
| MARSHALL | MEADE | SUITE 200 CANONSBURG, I | PA 15317 |
| DRAWN BY | JOB NO. | DATE | SCALE |
| K.G.M. | 8811 | 05/01/2019 | NONE |

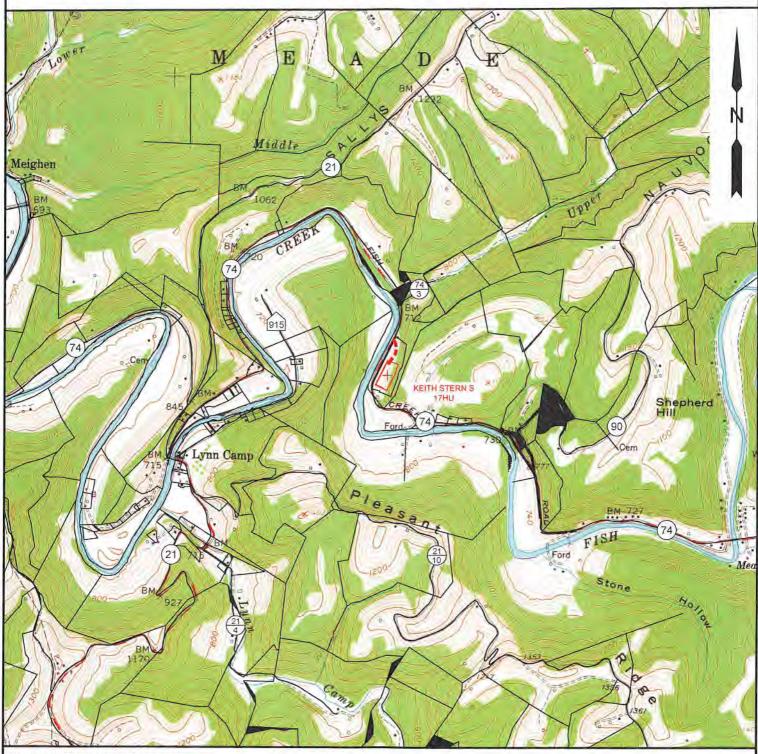
KEITH STERN S



WW-9

PROPOSED KEITH STERN S - 17HU

47 0 5 0 2 2 6 6 SUPPLEMENT PG. 2



NOTE: CLOSEST WATER PURVEYOR GRANDVIEW - DOOLIN PUBLIC SERVICE DISTRICT PROCTOR, WV LAT: 39.7137712 LON: -80.8258327

LOCATED: S 60°11'49" W AT 43,719,31' FROM THE CENTER OF KEITH STERN S WELL PAD LOCATION.



| TOPO S | ECTION: | OPER. | ATOR: |
|----------|-----------|-------------------------|------------|
| GLEN EAS | STON 7.5' | PREPARED FO | |
| COUNTY | DISTRICT | 380 SOUTHPOI | NTE BLVD |
| MARSHALL | MEADE | SUITE 200 CANONSBURG | , PA 15317 |
| DRAWN BY | JOB NO. | DATE | SCALE |
| K.G.M. | 8811 | 05/01/2019 | 1" - 2000' |





Well Site Safety Plan

Tug Hill Operating, LLC

Well Name: Keith Stern S-17HU

Pad Location: Keith Stern Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

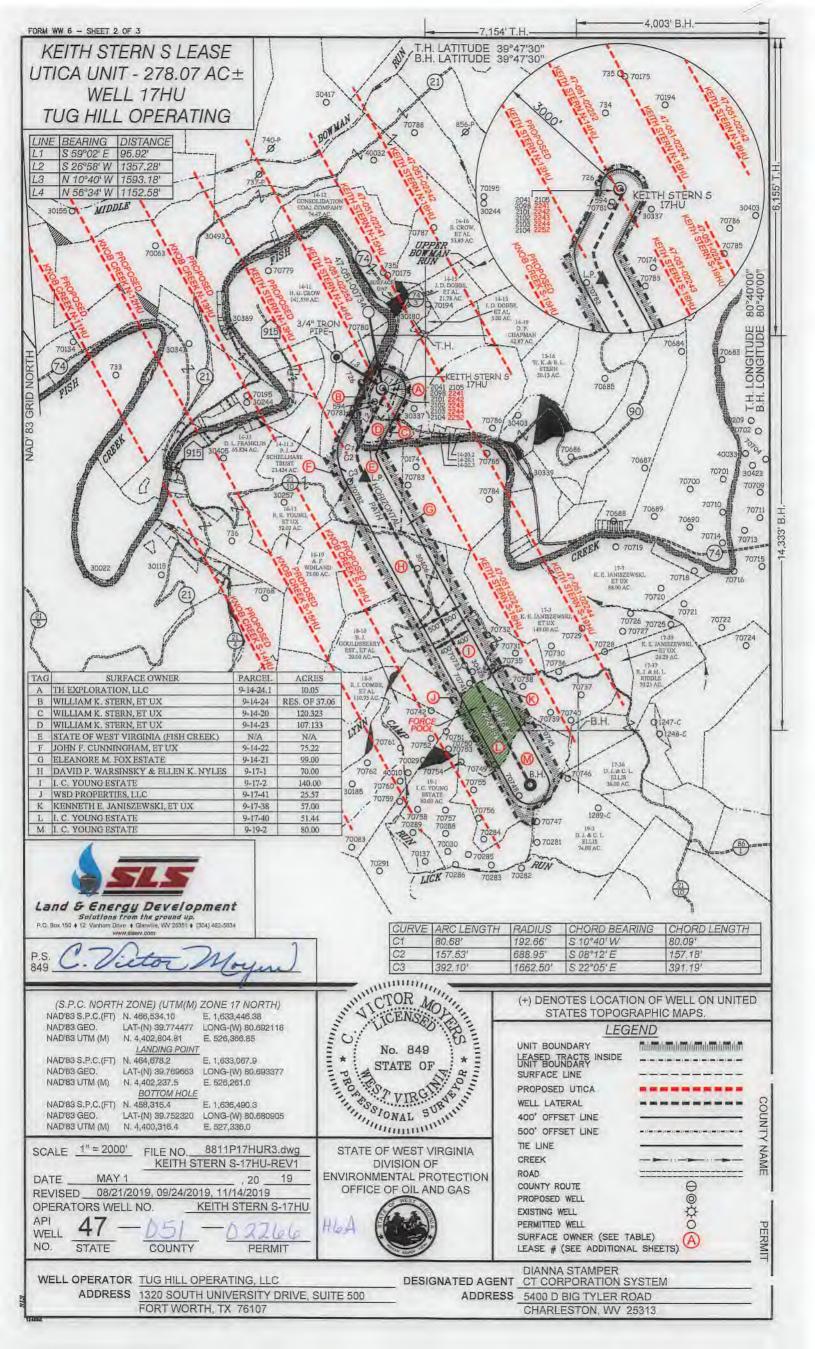
Northing: 4,402,804.81

Easting: 526,366.85

May 2019

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Office of Oil and Gas
AUG 27 2019

WW Department of Environmental Protection



NAD'83 GEO.

NAD'83 UTM (M)

T.H. B.H.

| MAP/PARCEL | ADJOINING SURFACE OWNER LIST | ACRES |
|------------|------------------------------|-------|
| 9-14-20.1 | WILLIAM K. STERN, ET UX | 1.321 |
| 9-14-20,2 | WILLIAM K. STERN, ET UX | 1,525 |
| 9-14-20.3 | WILLIAM K, STERN, ET UX | 0.831 |

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH) NAD'83 S.P.C.(FT) N. 466,534.10 E. 1,633,446.38 LAT-(N) 39.774477 LONG-(W) 80.692118 NAD'83 GEO. E. 526,366.85

NAD'83 UTM (M) N. 4,402,804.81

LANDING POINT

NAD'83 S.P.C.(FT) N. 464,678.2 E. 1,633,067.9 LONG-(W) 80.693377 LAT-(N) 39.769663

N. 4,402,237.5 E. 526,261.0

BOTTOM HOLE

NAD'83 S.P.C.(FT) N. 458,315.4 NAD'83 GEO. LAT-(N) 39.752320 NAD'83 UTM (M) N. 4,400,316.4

E. 1.636,490.3 LONG-(W) 80.680905

E. 527,336.0

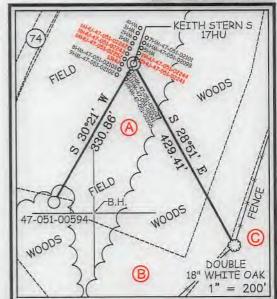
T.H.

NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS 250 SO. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD. 2. WELL SPOT CIRCLE & TOPO MARK SCALE ARE 1"=2000'

3. PROPOSED LATERAL OR TOP HOLE OF KEITH STERN S-17HU IS WITHIN 3000' OF THE TOP HOLES OR LATERALS OF PROPOSED KEITH STERN N-13HU, KEITH STERN N-14HU (47-051-02252), KEITH STERN N-15HU (47-051-02241), KEITH STERN N-16HU (47-051-02242), KEITH STERN S-18HU (47-051-02244), PROPOSED KNOB CREEK N-13HU, PROPOSED KNOB CREEK S-15HU, PROPOSED KNOB CREEK S-16HU.

REFERENCES





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

P.S

849

MINIMUM DEGREE OF ACCURACY

No. 849
** STATE OF VIRCHIMAN STONAL SURVINIAN SURVINIAN SURVINIAN STONAL SURVINIAN SURVI 8811P17HUR3.dwg FILE NO.

KEITH STERN S-17HU-REV1 1" = 2000

HORIZONTAL & VERTICAL CONTROL DETERMINED BY

SCALE DGPS (SURVEY GRADE TIE TO CORS NETWORK)

STATES TOPOGRAPHIC MAPS. , 20 _ 19 MAY 1 DATE REVISED 08/21/2019, 09/24/2019, 11/14/2019 OPERATORS WELL NO. KEITH STERN S-17HU HLOA WELL PERMIT PERMIT NO. STATE COUNTY

(+) DENOTES LOCATION OF WELL ON UNITED

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



| WELL TYPE: OIL | GAS_X INJECTION | WASTE DISPOSAL | IF "GAS" PRODUC | TION X STORAGE I | DEEP_X_ SHALLOW |
|------------------------|--|----------------|--------------------|-----------------------|------------------|
| LOCATION: ELEVATION | GROUND = 1,342.20' PROPOSED = 1,326.35' | WATERSHED_ | FISH CREEK (| HUC 10) | |
| DISTRICT | MEADE | COUNTY_ | MARSHALL | QUADRANGLE | GLEN EASTON 7.5' |
| SURFACE OWNER | TH EXPLORATION, LLC | | | ACREAGE | 10.05± |
| ROYALTY OWNER | ISAAC CROW, ET AL - SE | EE WW-6A1 | | ACREAGE | 10.05± |
| PROPOSED WORK | : | | | LEASE NO | SEE WW-6A1 |
| DRILL X C | ONVERT DRILL D | EEPER F | EDRILL | FRACTURE OR STIMULATE | X PLUG OFF OLD |
| FORMATION | PERFORATE NEW FORMA | TION PLU | IG AND ABANDON | CLEAN OUT AND R | EPLUG OTHER |
| PHYSICAL CHANGE | EIN WELL (SPECIEY) | | | TARGET FORMATION | POINT PLEASANT |

WELL OPERATOR TUG HILL OPERATING, LLC

ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500

FORT WORTH, TX 76107

DESIGNATED AGENT

DIANNA STAMPER CT CORPORATION SYSTEM

ESTIMATED DEPTH_ TVD: 11,376' / TMD: 18,954'

ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

KEITH STERN S LEASE UTICA UNIT - 278.07 AC± WELL 17HU TUG HILL OPERATING



| NO. | Lease ID | Tag | Parcel | Grantor, Lessor, Etc. | Deed Bo | ok/Page |
|-----|----------------|-----|-----------------|---|---------|---------|
| 1 | 10*15605 | Α | 9-14-24.1 | ISAAC CROW ET UX | 74 | 394 |
| 2 | 10*15605 | В | 9-14-24 | ISAAC CROW ET UX | 74 | 394 |
| 3 | 10*15509 | С | 9-14-20 | WILLIAM K STERN AND BETTY L STERN | 718 | 320 |
| 4 | 10*15812 | D | 9-14-23 | WILLIAM K STERN AND BETTY L STERN, ET AL | 687 | 220 |
| 5 | 10*23458 | E | WV - FISH CREEK | WEST VIRGINIA DIVISION OF NATURAL RESOURCES | 1019 | 373 |
| 6 | 10*16479 | F | 9-14-22 | JOHN F CUNNINGHAM AND BERNEICE K CUNNINGHAM | 826 | 88 |
| 7 | 10*47051.243.1 | G | 9-14-21 | MARY A FOX, ET AL | 879 | 332 |
| 8 | 10*17135 | Н | 9-17-1 | ELLEN K NYLES, ET AL | 919 | 625 |
| 9 | 10*15910 | 1 | 9-17-2 | SHIRLEY KOONTZ, ET AL | 701 | 303 |
| 10 | TH #27877 | J | 9-17-41 | JOHN T. GALLAHER AND EMILY J. GALLAHER | 1065 | 480 |
| 11 | 10*47051.185.1 | K | 9-17-38 | HOMER L SIMMONS AND GLADYS R SIMMONS, ET AL | 885 | 68 |
| 12 | 10*23194 | L | 9-17-40 | *FORCE POOL* ALBERT AND CHRISTOPHER HARTLEY | 60 | 160 |
| 13 | 10*18610 | M | 9-19-2 | NEIL ROBERT YOUNG, ET AL | 934 | 636 |

| | | FILE I | | 8811P1 TERN S- | | |
|----------|----------|----------|-------|-------------------|--------|------|
| DATE | MAY 1 | | | | , 20 _ | 19 |
| REVISED_ | 08/21/20 | 019, 09/ | 24/20 | 19, 11/14 | 4/2019 | |
| OPERATO | RS WELL | NO. | K | EITH STE | RN S- | 17HU |

No. 849

STATE OF

VIRCHIA PERMIT

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



P.S.

WELL OPERATOR TUG HILL OPERATING, LLC

COUNTY

API

WELL

47

STATE

1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107 ADDRESS

DIANNA STAMPER CT CORPORATION SYSTEM

ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

| WW-6A | 1 |
|--------|---|
| (5/13) | |

| Operator's Well No. | Keith Stern S-17HU |
|---------------------|--------------------|
|---------------------|--------------------|

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 | Granton Losson ata | Granton Laggan ata | Davidty | Book/Page |
|-------------------------|-----------------------|-----------------------|---------|-----------|
| Number | Grantor, Lessor, etc. | Grantee, Lessee, etc. | Royalty | DOOK/Fage |

*See attached pages

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

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

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

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

| Well Operator: | Tug Hill Operating, LLC | RECEIVED Office of Oil and Gas |
|----------------|---|--------------------------------|
| By: | Amy L. Miller MyShell | AUG 27 2019 |
| Its: | Permitting Specialist - Appalachia Region | , sent of |
| | | WV Department of |

Page 1 of

Ww-6A1 Supplement

Operator's Well No. Keith Stern S - 17HU

| 10*19400 | 10*19392 | 10*18808 | 10*18797 | 10*18766 | 10*18763 | 10*18678 | 10*18677 | 10*18676 | 10*18675 | 10*18674 | 10*186/3 | 10*18073 | 1041965 | 10*10052 | 10*18649 | 10*18648 | 10*1864/ | 10*18645 | 10"18644 | 10*18617 | 10*18612 | 10*18520 | 10*18518 | 10*18515 | 10*18512 | 10*18491 | 10*18490 | 10*18485 | 10*18484 | 10*18432 | 10*18430 | 10*18429 | 10*18421 | 10*18420 | 10*18419 | 10*18358 | 10*18357 | 10*18356 | 10*18355 | 10*18354 | 10*18299 | 10*18269 | 10*16436 | 10*15812 | | 10*15509 | 10 15605 | 47 | 0 ! | 10/73/605 | 44 | 0 | L | Lease ID |
|--------------------|----------------------------------|--------------------|--------------------|--------------------|----------------------------------|--------------------------|--------------------|----------------------|-----------------------|---------------------------------------|----------------------------------|--------------------|--------------------|--------------------|---------------------------------|--|------------------------------------|--------------------------------|-----------------------------------|--------------------------------------|--------------------|--------------------|--------------------|--------------------|---|-----------------------------------|--------------------|----------------------|--------------------|--------------------|----------------------------|---------------------------------|-------------------------------------|-----------------------------------|--------------------|--------------------------------|--------------------|--------------------|------------------------------------|--------------------|----------------------------------|--------------------|---------------------------------------|---|--|--|-------------------|---|--|---------------------------------------|---|---|------------------|-------------------------|
| 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 2-14-25 | 9-14-23 | 0 14 2 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | | 9-14-20 | 9-14-24 | | | 9-14-24.1 | | | | Parcel |
| D BUL | | PA | ┸ | L | L | D WILI | D PATI | D JENI | D JEFF | HOL | L | | | \downarrow | BOD | | PEI | | 1 | 1 | | Ļ | 10 | D WILI | D CHR | D LOR | D STAG | | D BRE | D ROS | D JAM | D GEO | L | D VICT | D CAR | D SHA | D DEB | D LAR | anr | D DEB | D CAR | L | L | D WILL | | o <u>&</u> | B ISAA | | | A ISAA | | | | Tag Grai |
| BULAFYOST | RODNEY W RUSH AND CRYSTAL D RUSH | PAIRICIA KIRCHNEK | DOREITA RUSH | TOM ALLEY | AUGHN HONE SR & LINDA MARIE HONE | VILLIAM LINSLEY CRISWELL | ATRICIA DOFKA | ENNIFER SHAWN GLOVER | EFFREY BRYAN CRISWELL | N T CRISWELL AND CATHERINE A CRISWELL | RACHEL IHORNE AND FRED IHORNE JK | ONCE IN ALLET | E BALLEY | SECRAL VIDBIC | RODNEY & BANE AND CATHIE I BANE | RENCE E CHIAPPETTA AND PATRICIA A CHIAPPETTA | PETER G STORCH AND LAURIE L'STORCH | SANUKA SUE HALL AND DAVID HALL | RANK A STORCH IR AND SOSAN STORCH | SHEILA SIMMONS AND JEFFREY R SIMMONS | VANNETTE BERLETCH | HRISTOPHER SAUDERS | SUSAN I BAKER | VILLIAM P DAUBE | CHRISTINA NESTELL AND CHARLES E NESTELL III | LORI A FARMER AND DANIEL K FARMER | STACY L BARNHART | BARBARA JO BEVERIDGE | BRENDA REED | OSEMARIE BERISFORD | AMES DUNN AND DONNA K DUNN | RGE L DUNN AND NANCY MARIE DUNN | DONNA JUNE STRAIT AND GARY E STRAIT | CTOR E ALLEY JR AND DEBRA A ALLEY | CARLA MAE ALLEY | HARLA ROLLINS AND GARY ROLLINS | EBORAH SUE KYLE | ARRY W ALLEY | JUDITH F TEMPLE AND LOUIS I TEMPLE | ORAH L TURLEY | CAROL L BOBBY AND DONALD J BOBBY | GENELDA MASON | GAN D YEATTS AND CHRISTOPHER M YEATTS | WILLIAM K STERN AND BETTY L STERN | | WILLIAM K STERN AND BETTY L STERN | ISAAC CROW ET UX | | | ISAAC CROW ET UX | | Environ | | Grantor, Lessor, Etc. |
| TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLORATION LLC | IH EXPLORATION LLC | TH EXPLOBATION LLC | TH EXPLORATION LLC | TH EXPLOBATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLOKATION LLC | TH EXPLORATION LLC | TH EXPLORATION ILC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | CHESAPEAKE APPALACHIA LLC | | NPAR, LLC | JOHN G CRAWFORD | | | JOHN G CRAWFORD | | | | Light Che, Lessee, Etc. |
| 1/8+ | 1/8+ | 1/84 | 1/8+ | 1/8+ | + | 1/8+ | H | H | 1/8+ | 1/8+ | 1/8+ | 1/01 | 1/81 | 1/81 | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/01 | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | - | H | ┝ | ŀ | ╀ | 1/8+ | | 1/8+ | 1/8+ | | | 1/8+ | | | | коуаку |
| 940 | 940 | 95/ | 93/ | 938 | 938 | 938 | 938 | 938 | 938 | 958 | 938 | 030 | 926 | 350 | 320 | 936 | 936 | 936 | 956 | 934 | 932 | 933 | 933 | 933 | 933 | 933 | 933 | 933 | 933 | 932 | 932 | 932 | 932 | 932 | 932 | 931 | 931 | 931 | 931 | 931 | 929 | 942 | 961 | 687 | | 718 | 74 | | | 74 | | | | Deed Book/Page |
| 342 | 336 | 647 | 622 | 223 | 225 | 588 | 585 | 576 | 582 | 5/9 | 5/4 | £7/4 | 17/4 | 173 | 164 | 161 | 757 | 153 | 155 | ET3 | 542 | 584 | 580 | 573 | 565 | 131 | 123 | 109 | 107 | 572 | 604 | 601 | 588 | 582 | 539 | 358 | 346 | 348 | 350 | 352 | 281 | 460 | 339 | 220 | 1 | 320 | 394 | | | 394 | - 1 | | | L |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N A | N/A | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1/4 | 2/2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N A | Company: 148/389 | Wheeling Natural Gas Company to Manufacturers Light &Heat | | Light &Heat Company: 148/389 | Manufacturers | Wheeling Natural | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 14/24 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | Oil Corp: 197/120 | Manufacturers Light & Heat Company to Union Gasoline & | | Union Gasoline & Oil Corp: 197/120 | Company to | Manufacturers | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1/2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ** | N/A | Company: 2/136 | Union Gasoline & Oll Corp to Preston Oll | | Preston Oil Company: 2/136 | Oil Corp to | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1/4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | Company: 2/225 | Preston Oil Company to Manufacturers Light & Heat | | 1 | ä | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 14/2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N N | Corp: 4204 | | Merger of Manufacturers | Transmission Corp: 4204 | Columbia Gas | Manufacturers Light & Heat | Merger of | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2/2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 4 | N/A | 537/518 | Transmission Corp to Columbia Natural Resources Inc: | Columbia Gas | es Inc: | ä | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | | N A | 19/398 | Columbia Natural Resources Inc to Columbia Natural Resources LLC: | Cert. of Conversion | Resources LLC: 19/398 | Resources Inc to Columbia Natural | Cert. of Conversion Columbia Natural | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Appalachia LLC to Statoil USA Onshore Properties Inc: 22/506 | Lnesapeake | N/A | 650/63 | | ī | | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Chesapeake Appalachia LLC to SWN Production Company: 33/110 | 3,7 | Z | 4 | | Chesapeake | | Onshore Onshore | Chesapeake Appalachia LLC to | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2/2 | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424 | r di di ci | AB Resources LLC & NPAR LLC to Chief Exploration & Development LLC and Radier 2000 Limited Partnership: 24/466 | ļ | Inc to Statoil USA Onshore Properties Inc - Online database 11/30/2009 name | Statoilhydro USA Onshore Properties | 11/30/2009 name change | Onshore Properties Inc - Online database | Onshore Properties Inc to Statoll USA | Statollhydro USA | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2/2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ion Cto | 201200 | Chief Exploration, Radier & Enerplus Resources Corp. to Chevron USA Inc: | | Statoil USA Onshore Properties Inc to Chevron USA Inc: | | Chevron USA Inc: 30/427 | Statoil USA Onshore Properties Inc to | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1/2 | 26 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | SWN Production Company LLC to TH Exploration LLC: 36/431 | 2001001 | NPAR LLC to Chevron USA Inc: | 30/461 | Chesapeake Appalachia LLC to Chevron USA Inc: | | Chevron USA Inc: 30/461 | Chesapeake Appalachia LLC to | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455 | rrc: 30/ 140 | Chevron USA Inc to TH Exploration | LLC: 36/148 | Chevron USA Inc | | to TH Exploration LLC: 36/148 | Chevron USA Inc | | | Assignment |

| 10*22501 | 10*22461 | 10*22380 | 10*22329 | 10*22328 | 10*22257 | 10*22150 | 10*22127 | 10*22110 | 10*22089 | 10*22057 | 10*22004 | 10*21997 | 10*21991 | 10*21979 | 10*21972 | 10*218/3 | 10*21837 | 10*21497 | 10*21493 | 10*21490 | 10*21443 | 10*21441 | 10*21396 | 10*21395 | 10*21229 | 10*21209 | 10*21111 | 10*21094 | 10*21028 | 10*19940 | 10*19935 | 10*19864 | 10*19862 | 10*19861 | 10*19859 | 10*19723 | 10*19712 | 10*19686 | 10*19611 | 10*19677 | 10*19626 | 10 19676 | 10*19531 | 10*1953 | 10*19527 | 10*19525 | 0 | 10 1990 | 10*19497 | 10:19433 | 10*19417 | 10#19485 | Ti asca II |
|---|--------------------|--------------------|------------------------|--------------------|---|--------------------------------------|---------------------------------------|---------------------------------------|--------------------|--------------------|------------------------|---------------------------------|---|--------------------|----------------------------------|--------------------|----------------------|-----------------------|--------------------|--|---|--|--------------------|------------------------------------|--------------------|-------------------------|------------------------------|--------------------------------------|--------------------|--------------------|--------------------|--|--------------------|---------------------------------|--------------------|-------------------------------------|-----------------------------------|---------------------------------|--------------------|------------------------------------|--------------------|-------------------------------|-----------------------------------|--------------------|--|--|---------------------------------|-------------------------------|--------------------|--------------------|---------------------|--------------------------------------|---------------------|
| 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | Darrol |
| D | D 0 | _ | \perp | D | | | | D JE | 0 0 | - c | 5 8 | 0 | 1T 0 | 0 Ω | | 5 3 | 0 | 0 | L | | 2 | ļ. | D | D, | 1 | 2 5 | L | Ц | œ. | | 2 5 | 0 | D S1 | ם י | D D | D | | | 1. | D N | 2 5 | 0 | o | 2 | 0 - 2 | D 77 | | 20 0 | ┵ | 0 | Ш | D . | - |
| UNDA K AND MICHAEL HUMES | BRIAN R MORGAN | ODITH'S KNIGHT | SALLY M COTEREL-CHANEY | SUSAN L GOLDSBERRY | CHARLES F ALLEY TRUST EMMANUEL PREVOLES TRUSTEE | CHAD ERIC BENNETT AND MARY A BENNETT | UDITH L BENEDICT AND LOUIS G BENEDICT | NNIFER ALLEY FISHER & ROBERT D FISHER | ARCIA A LUKE | ARRY R CRANE | ALPH EDWARD WILLIAMSON | IICHAEL SAUDERS AND AMI SAUDERS | HE JOANN REILLY TRUST KIMBERLY MAEZ TRUSTEE | HARLES C SEAMON | ATHERINE I AND ERNEST M SILVERIO | OHN WILLIAMSON IB | WILLIAM BRYAN COLLEY | KATHLEEN G WILLIAMSON | DENZIL ALLEY JR | DANIEL E WILLIAMSON AND HEATHER R WILLIAMSON | ROBERT L LANDRIS AND LIBERTY JANE LANDRIS | SEPH A MURPHY AND VIRGINIA ANNE MURPHY | IICHAEL D ZUCKER | ANIEL L LANDRIS AND JOAN L LANDRIS | TARA E CAUSEY | CHARLES & WILLIAMSON JK | ONNA G AND PAUL L CHMELYNSKI | KATHERINE DEGROOT AND DANIEL DEGROOT | BRENDA GILBERT | MMA JO CRISWELL | ARA E STARC | DE Y KELLER JR AND SHARON MARIE KELLER | ACY R BENNETT | SEPH F STARC JR AND DONNA STARC | IZABETH A STARC | EID ELATTRACHE AND TONYA ELATTRACHE | HAZ AARON COLLEY AND DANA COLLINS | KAREN J AND MICHAEL E BRUGGEMAN | TIMOTHY LEE COLLEY | VEIL SCHAFER AND CHRISTAL L SHAFER | ONALD W REINBEAU | URR SUCKEL & ELIZABETH SUCKEL | ELBERT D RUSH AND BETTY RUTH RUSH | SHAROL K CASADA | AUGUSTUS RUSH MCMAHON III TRUSTEE OF THE PAMELA I MCMAHON REVCBLE TRUST | TRUST EES OF THE AUGUSTUS R MCMAHON III LIVING | CMAHON III AND MICHELE M MCMAHO | REED O MILLER | | | | ANN MARIE STEVENS AND CURTIS STEVENS | |
| AMERICAN PETROLEUM PARTNERS LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | ļ | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | A TH EXPLORATION LLC | TH EXPLORATION LLC | _ | TH EXPLORATION LLC 1/8+ 933 5 | TH EXPLORATION LLC | TH EXPLORATION (LC | TH EXPLORATION (19) | TH EXPLORATION LLC | Grantae Lessee Ftc. |
| 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | | 1/8+ | 1/8+ | 1/8+ | MO1/8+ | A Ame | Percen I |
| 948 | 964 | 292 | 962 | 962 | 970 | 954 | 961 | 961 | 961 | 953 | 95.3 | 953 | 953 | 954 | 960 | 960 | 959 | 957 | 958 | 957 | 956 | 956 | 956 | 956 | 952 | 95) | 951 | 951 | 951 | 948 | 948 | 945 | 945 | 945 | 945 | 957 | 957 | 944 | 944 | 944 | 944 | 944 | 942 | 943 | 953 | 942 | | 98 | 941 | 934 | 939 | 939 | S. P. P. S. |
| 372 | 453 | 128 | 34/ | 549 | 26 | 338 | 343 | 347 | 333 | 344 | 503 | 505 | 341 | 340 | 586 | 24 | 627 | 324 | 64 | 153 | 879 | 631 | 647 | 625 | 432 | 434 | 154 | 151 | 159 | 551 | 30 | 610 | 608 | 605 | 601 | 131 | 139 | 142 | 140 | 147 | 456 | 150 | 615 | 1 | 339 | 635 | | 571 | 320 | 600 | 95 | 87 | ē |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | 1 | | N/A | П | N/A | - 1 |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | | | Ц | _[| |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/> | N/A | | N/A | N/A | N/A | N/A | N/N | Accionment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Accionment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Accionment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Arcianment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Arrianment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | reignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | ı | | Н | - 1 | - |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Accimment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | Accimpant |
| American Petroleum Partners Operating LLC to TH Exploration LLC: 42/109 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A Assignment | A! |

| Operator's |
|----------------------|
| Well No. |
| Keith Stern S - 17HU |

| 7,7016 | 10*15915 | 10*15914 | 10*15913 | 10*15912 | 10*15911 | 10*15910 | 10*17136 | 10*17135 | 10*47051.243.5 | 10*47051.243.4 | 10*47051.243.2 | 10*47051.243.1 | | 10*23458 | 10*23148 | 0.778/3 | 10-22878 | 10432854 | 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 10*22778 | 10*22775 | 0 2 2 | Lease ID | WW-6AT Supplement |
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| 8.17.3 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-1 | 9-17-1 | + | Н | 9-14-21 | ++ | | WV - FISH CREEK | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | 9-14-23 | Parcel | aiddne |
| - | _ | _ | _ | _ | _ | _ | Ξ | = 6 | <u>ه</u> | 6 | a a | 6 | n | m | D | c | , 0 | o | 0 0 | , 0 | D | 0 | Tag | |
| CHRISTI I NAVI CI ANTONI | JUDY WARNER | JUDY CALLOWAY | LICA MCGUIRE | DELORES I RICHTER | ROBERT W. GRAY | SHIRLEY KOONTZ | DAVID P WARSINSKY | ELLEN K NYLES | LOUIS T FOX AND KAREN A FOX | DAVID E FOX | MARK H FOX | MARY A FOX | TOUR E CLIMINING WAY WATCHER E CLIMINING TO THE CONTROL OF THE CON | WEST VIRGINIA DIVISION OF NATURAL RESOURCES | IDA A ALLEY AND J F ALLEY | BRENDAN C. REILLY | AUBREY E REILLY | SUSAN EXLINE | HANDT W MORRIS SK AND CHEKTL MORKIS JULIA RAE BROOKS | DANNY E COCHRAN AND LORI ANN COCHRAN | DIANNA LEA SHEPARD | JAMES P MILLER | Grantor, Lessor, Etc. | |
| CHESAPEAKE | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | Ш | | TH EXPLORATION LLC | HOPE NATURAL GAS CO | IN EXPLORATION CLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | AMERICAN PETROLEUM | Grantee, Lessee, Etc. | |
| ; | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/01 | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | Royalty | |
| | 715 | 715 | 715 | 715 | 715 | 701 | 919 | 919 | 876 | 876 | 879 | 879 | × 26 | 1019 | 117 | 3// | 977 | 977 | 977 | 972 | 970 | 946 | Deed Book/Page | |
| 252 | 451 | 450 | 449 | 448 | 441 | 303 | 627 | 625 | 2 88 | 55 | 33 33 | 332 | 8 | 373 | 45 | 6 | 26 | 32 | 30 | 46 | 30 | 215 | | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N N | N/A | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Z | N/A | N/A | 17/2 | N/A | N/A | N/A | N/A | N/A | × A | Assignment | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N /A | Assignment | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Z | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | |
| ; | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | z | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Z/A | Assignment | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2/2 | N/A | N/A | NA | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Z/o | N/A | N/A | | 1 | N/A | | | | | Assignment | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2/2 | N/A | Hope Natural Gas Company to Consolidated Gas Supply Corp: 374/234 | NA | N/A | N/A | N/A | N/A | N/A | WA CAN HOUSE AND | Assignmant | Office Of |
| | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Z | N/A | Consolidated Gas Supply Corp to Consolidated Gas Transmission Corp: 505/406 | N/A | N/A | N/A | N/A | N/A | N/A | mental Pro | Assignment | 7 7019 |
| Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | N/A | N/A | N/A | N/A | N/A | N/A | 2 | N/A | Consolidated Gas Transmission Corp to CNG Development Company: 515/88 | N/A | N/A | N/A | N/A | N/A | N/A | ×× | Olsofo Bent | • |
| o Chesapeake Appalachia LLC to SWN Production Company: | Chesapeake Appalachia LLC to SWN Production Company: 33/110 | Appalachia LLC to SWN Production Company: 33/110 | Chesapeake Appalachia LLC to SWN Production Company: 33/110 | | o Chesapeake Appalachia LLC to SWN Production Company: 33/110 | Chesap Appala SWN P Compa | N/A | N/A | N/A | N/A | N/A | N/A | 2 | | CNG Development Company merged into CNG Producing Company | N/A | 1 | N/A | 1 | 1 | | | Assignment | |
| State Prop Exch | Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424 | Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424 | Properties Inc to SWN Exchange Titleholder | o Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424 | o Statoii USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424 | Statoil U | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | CNG Producing Company changed Id name to Dominion Exploration & Production Inc - 5/10/2000 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | |
| | Merger - SWN Exchange Titleholder WN (LC to SWN er Production Company LLC: 19/624 | Merger - SWN Exchange Titleholder WN LLC to SWN er Production Company LLC: 19/624 | | Merger - SWN Exchange Titleholder WN LLC to SWN ler Production Company LLC: 19/624 | | Merger - Exchange N LLC to SV Production | N/A | N/A | N/A | N/A | N/A | N/A | Fossil Creek Ohio, | N/A | Dominion & Exploration & production Inc changed its name to Consol Gas Company: 19/546 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | |
| older SWN Production Company LLC to | Company LLC to pany TH Exploration LLC: 36/431 | Sider SWN Production Company LLC to pany TH Exploration LLC: 36/431 | older SWN Production Company LLC to Pany TH Exploration LLC: 36/431 | older SWN Production Company LLC to pany TH Exploration LLC: 36/431 | older SWN Production Company LLC to pany TH Exploration LLC: 36/431 | LC: 3 | N/A | N/A | N/A | N/A | N/A | N/A | Fossil (LLC to | 1 | Consol Gas ne to Company merged (with and into CNX 1 46 Gas Company LLC L | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | |
| Stat Prog TH E | Statoil USA ion Onshore to Properties Inc to TH Exploration LLC: 36/455 | Statoil USA ion Onshore to Properties Inc to TH Exploration LLC: 36/455 | | Statoil USA ion Onshore to Properties Inc to TH Exploration LLC: 36/455 | | Statoil Onsho Proper TH Exp | | | _ | | N/A | | Gulfport Energy Ohio, Corp & Fossil ort Creek Ohio LLC to TH Exploration | N/A | CNX Gas erged Company LLC to CNX TH Exploration y LLC LLC: 42/140 | - | N/A | | | N/A | | American Petroleum Partners Operating LLC to TH Exploration LLC: 42/109 | t Assignment | |

Operator's Well No. Keith Stern S - 17HU

| 10*17241 | 10*17240 | 10*17239 | 10*17238 | 10*17237 | 10*17236 | 10*17235 | 10*17234 | 10*17233 | 10*15920 | 10*15919 | 10.15918 | 0 2 | Lease ID |
|---|--|--|---|--|---|---|--|---|--|---|---|--|-----------------------|
| 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | ID Parcel |
| - | - | - | - | - | - | - | - | - | - | - | - | - | el Tag |
| BARBARA K BURLEY | BONNIE GRISELL | ANITA RAE MILLER | LISA ANN MCDOWELL | JENNIFER WHEATON | TEXYN L MILLER | WINONA RIDDLE | GAREN P. MCDOWELL | пиотну мсромец | DENNIS KOTKE | CAROLYN SUE HENRY | ARTHUR EMORY | CINDY LOU SMITH | Grantor, Lessor, Etc. |
| СНЕЅАРЕАКЕ АРРАЈАСНА ЦС | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | CHESAPEAKE APPALACHIA LLC | Grantee, Lessee, Etc. |
| 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | Royalty |
| 716 | 715 | 715 | 715 | 715 | 716 | 715 | 716 | 713 | 715 | 715 | 715 | 715 | Deed Book/Page |
| 290 | 331 | 336 | 341 | 610 | 270 | 353 | 280 | 355 | 458 | 454 | 457 | 453 | ш |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N (| \$ P | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N Departit | Assignment Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Washitounia Na Na | Assoning |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204 | Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoll USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Appalachia LLC to Appalachia LLC to Statoil USA Onshore Properties Inc: 24/67 | Appalachia LLC to Statoll USA Onshore Properties Inc: 29/325 | Appalachia LLC to Statoil USA Onshore Properties Inc: 24/67 | Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325 | Assignment |
| | to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | Chesapeake Appalachia LLC to SWN Production Company: 33/110 | Company: 33/110 | 8 | C to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | 2 to Chesapeake Appalachia LLC to SWN Production Company: 33/110 | Assignment |
| | to Statoil USA Onshore n Properties Inc to SWN Exchange Titleholder LLC: 33/424 | to Statoil USA Onshore n Properties Inc to SWN Exchange Titleholder LLC: 33/424 | to Statoil USA Onshore Properties inc to SWN Exchange Titleholder LLC: 33/424 | to Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424 | to Statoil USA Onshore Properties inc to SWN Exchange Titleholder LLC: 33/424 | | C to Statoil USA Onshore on Properties Inc to SWN Exchange Titleholder LLC: 33/424 | C to Statoil USA Onshore on Properties Inc to SWN Exchange Titleholder LLC: 33/424 | C to Statoil USA Onshore on Properties Inc to SWN Exchange Titleholder LLC: 33/424 | C to Statoil USA Onshore on Properties Inc to SWN Exchange Titleholder LLC: 33/424 | C to Statoil USA Onshore on Properties Inc to SWN Exchange Titleholder LLC: 33/424 | C to Statoil USA Onshore on Properties Inc to SWN Exchange Titleholder LLC: 33/424 | Assignment |
| Merger - SWN Exchange Titleholder N LLC to SWN Production Company LLC: 19/624 | Merger - SWN Statoli USA Exchange Titleholder Onshore WI LLC to SWN Properties Inc to Production Company ITH Exploration LLC. 19/624 LLC. 41/248 | Merger - SWN Statoli USA Exchange Titleholder Onshore WI LLC to SWN Properties inc to Production Company H Exploration LLC: 19/624 LLC: 41/248 | Merger - SWN Statoil USA Exchange Titleholder Onshore WN LLC to SWN Properties inc to Production Company H Exploration LLC: 19/624 LLC: 41/248 | Merger - SWN Statoli USA E Exchange Titleholder Onshore WI LLC to SWN Properties inc to Production Company H Exploration LLC: 19/624 LLC: 41/248 | Merger - SWN Exchange Titleholder VILC to SWN Production Company LLC: 19/624 | Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624 | Merger - SWN Exchange Titleholder V LLC to SWN Production Company LLC: 19/624 | Merger - SWN Statoli USA e Exchange Titleholder Onshore WN LLC to SWN Properties Inc to er Production Company TH Exploration LLC: 19/624 LLC: 41/248 | Merger - SWN e Exchange Titleholder SWN Production WN LLC to SWN Company LLC to fer Production Company TH Exploration LLC: 19/624 LLC: 86/431 | Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624 | Merger - SWN re Exchange Titleholder SWN Production WNI LLC to SWN Company LLC to Fer Production Company H Exploration LLC: 19/624 LLC: 36/431 | Merger - SWN Refer - SWN Production WN LLC to SWN WN LCC to SWN WN LCC to SWN LCC 19/624 LCC: 19/624 LCC: 36/431 | Assignment Assignment |
| 8 | SWN Production Inc to Company LLC to TH Exploration RE LLC: 41/256 | ő | 8 | 8 | SWN Production Sinc to Company LLC to ation TH Exploration 48 LLC: 41/256 | | _ | A SWN Production s Inc to Company LLC to ation TH Exploration LLC: 41/256 | Statoil USA duction Onshore LLC to Properties Inc to ation TH Exploration LLC: 36/455 | Statoil USA duction Onshore LLC to Properties Inc to ation TH Exploration LLC: 36/455 | | Statoil USA duction Onshore LLC to Properties Inc to ation TH Exploration LLC: 36/455 | ent Assignment |

| 10*19933 | 10*19879 | 10*19713 | 10*19668 | 10*19624 | 10*19620 | 10*19619 | 10*19618 | 10*19532 | 10-19508 | 10*19408 | TO 19575 | 10*19373 | 10*18762 | 10*18658 | 10*18656 | 10*18655 | 10*18624 | 10*18623 | 10*18622 | 10*18621 | 10*18620 | 10*18619 | 10*1851/ | 10*18517 | 10*18788 | TO TO#0/ | 10*18/97 | 10*10417 | 10*18295 | 10*18264 | 10*18263 | 10*18262 | 10*18261 | 10*18260 | 10*18259 | 10*18199 | 10*18198 | TO-18194 | 10#18104 | 10#18103 | 1010100 | 10*19160 | 10*19169 | 10*18167 | 10*18107 | 10*18099 | 10*17981 | 10*17709 | 10*17673 | 10*17666 | 10.1/245 | 10*17245 | | | | 10*17244 | 4 | , | 7 | | 10.00 | | 5 | | dia. | 10*17242 | 0 | æ | 2 | C Selse ID |
|--------------------|-----------------------------------|--------------------|---------------------------------------|--------------------|------------------------------------|--------------------|--------------------|---------------------|----------------------------------|--------------------|--------------------|--------------------|--------------------|-------------------------|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|--------------------|---------------------|------------------------------------|-----------------------|------------------------------------|------------------------------------|------------------------------------|--------------------|-----------------------------------|---------------------------------------|--|--|---|-------------------------------|--------------------|---------------------------------------|---------------------------------------|---------------------------------|------------------------------------|---|---------------------|---------------------|--------------------------|----------------------------|--------------------|-----------------------------------|------------------------------------|--------------------|--|--------------------|--|-------------------------|--------------------------|------------------------|--------------|----------------|---------------------|----------------|----------------------|------------|------------------|-------------------|-----------------------|------------------|------------|-------------------|--------------------------|----------------|---------------|---------------------------|
| 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-1/-2 | 9-17-2 | 3-1/-Z | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-1/-2 | 9-17-2 | 9-1/-2 | 9-1/-2 | 9-1/-2 | 2-17-6 | 9-17-2 | 0 1772 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-1/-2 | 7-7-5 | 2-1/-2 | 2-7-2 | 2-12-2 | 0.17-2 | 0-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 9-17-2 | 3-1/-Z | 0.17.3 | | | | 9-17-2 | | | | | 9-17-2 | | | - | | 9-17-2 | | | | Parcel |
| MARY ANN GRIFFITH | MARY V GILSON AND WALTER M GILSON | MARSHA BERISFORD | MELISSA D FLETCHER & SCOTT A FLETCHER | I JOHN T YINGLING | RONALD R YOUNG AND GERALDINE YOUNG | ERICJ YOUNG | I RONALD W YOUNG | CYNTHIA K KIRCHHOFF | SIONE HILL MINERALS HOLDINGS LLC | CAROLYN J YOUNG | JESSICA WITCH TON | IESSICA WHEATON | TRACY L BARNBY | I ELIZABETH JANE KELLER | PAMELA CALL | PATRICIA L LEHN | I CLARA SUE YOUNG | I NEIL ROBERT YOUNG | I CHAD A YOUNG | MARK A WALKER | MICHAEL A WALKER | LOIS ELAINE WICKHAM | LORI SHANAHAN AND PATRICK SHANAHAN | PAIRICIA LUANNE BUNAK | CHARLINE M ENGLE AND KEVIN E ENGLE | INMINET COMMISSE AND SOUND STANGER | NANCY I STANGEL AND JOHN I STANGEL | CHEBALL MILL | THOMAS B BAKER AND VICKIE BAKER | I DAVID MCDOWELL AND CRYSTAL MCDOWELL | I LISA ANN MCDOWELL AND ROBERT JOSEPH HILL | I KAREN MCDOWELL CECIL AND JAMES E CECIL | I TIMOTHY MCDOWELL AND CYNTHIA MCDOWELL | I GEMMA RUDY AND TIMOTHY RUDY | JENNIFER WHEATON | I LAWRENCE J VAUGHN AND GAIL L VAUGHN | MARY THERESA SOLEAU AND THOMAS SOLEAU | PAMELA BETLER AND CHAD K BETLER | CANOCIN LEG FONCI AND MANING FONCI | CAROLYN I EE EI BEY AND MARTIN I EI BEY | CALCAL MICHARD | TAREN E WILLIAMS | NOTE CHE AND MICHIGA CHE | NEIL CALL AND MELINDA CALL | ANITA MAE MASON | RAF ELLEN ELOYD AND KENNETH ELOYD | MICHAEL E SWIET AND MELODY A SWIET | CAROL GONGOLA | IACOLIETYN S EEEBRABI AND JOHN C SEBBABI | SNODGRASS | LILA FAYE BONAR SNODGRASS AND DONALD T | CHAD E LONGEE LOW | | | | I KAREN CECIL | | | | | I DAVID MCDOWELL | | | | | I GERALD L MILLER | | | | Tag Grantor, Lessor, Etc. |
| TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLORATION LLC | TH EXPLORATION LLC | IN EXPLORATION LLC | TH EXPLORATION LIC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LCC | IN EXPLORATION LEC | TH EXPLORATION LLC | TH EXPLORATION LLC | | | TH EXPLORATION LLC | | | | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLORATION LLC | THE EXPLORATION LLC | TH EXPLORATION LLC | THE EXPLORATION LEG | THE EXPLORATION LEC | TH EXPLORATION LLC | TH EXPLOBATION I.C | TH EXPLOBATION LIC | TH EXPLORATION LIC | TH EXPLORATION LIC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | אריאנאנחוא נוני | CHESAPEAKE | | - | | APPALACHIA LLC | CHESAPEAKE | | | | APPALACHIA LLC | CHESAPEAKE | | | | APPALACHIA LLC | CHESAPEAKE | | | Grantee, Lessee, Etc. |
| 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/0+ | 1/81 | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/01 | 1/01 | 1/01 | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | +8/1 | 1/01 | 1/6+ | 1/01 | 1/01 | 1/01 | 1/81 | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/0 | | | | 1/8+ | | | | | 1/8+ | | _ | | | 1/8+ | | | | Royalty |
| 948 | 945 | 944 | 938 | 944 | 937 | 937 | 937 | 942 | 941 | 940 | 155 | 031 | 938 | 936 | 936 | 936 | 934 | 934 | 934 | 934 | 934 | 934 | 933 | 925 | 933 | 200 | 256 | 225 | 979 | 928 | 928 | 928 | 928 | 928 | 929 | 928 | 928 | 876 | 949 | 920 | 227 | 22/ | 32,7 | 927 | 977 | 927 | 925 | 949 | 932 | 949 | 83 | § — | | | | 716 | | | | | 717 | | | | | 716 | | | | Deed Book/Page |
| 55 | 588 | 452 | 326 | 209 | 365 | 377 | 371 | 637 | 446 | 149 | 114 | A11 | 481 | 107 | 100 | 95 | 629 | 626 | 624 | 622 | 620 | 617 | 5/5 | 1 12 | 1 12 | 113 | 11 1 | 707 | 263 | 549 | 551 | 555 | 553 | 584 | S. | 532 | 643 | 500 | 3 | 150 | 020 | 50 | 254 | 700 | 3857 | 2 2 | 377 | 167 | 567 | 172 | 210 | 10 | | | | 295 | | | | | 26 | | | | _ | 285 | | | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | | N/A | | | | | N/A | | | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/M | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | | N/A | | | | | N/A | | | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/A | N/A | N/A | | | | | N/A | | | | | N/A | | | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | | N/A | | | | | N/A | | _ | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/N | N/N | N/A | N/A | N/A | N/A | N/A | | | | | N/A | | | | | N/A | | | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/M | N/A | N/A | N/A | N/A | N/N | N/A | N/A | N/A | N/A | N/A | 2 | | | | N/A | | | | | N/A | | | | | N/A | | | | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/N | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | | N/A | | | | | N/A | | | | | N N | EINI | NO NO | N Oatral | Assignment |
| N/A | N/A | N/A | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | N/A | | | | | N/A | | | | | N/A | | ģ | antal , | Assigniment O' |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | W/W | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | | N/A | | | | | N/A | | | | | N/A | | | | Assignment |
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| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1/2 | N/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | LLC: 19/624 | lder Production Company | - | | Margar Chin | LLC: 19/624 | der Production Com | SWN IIC to SWN | Merger - SWN | | | | | Merger - SWN | | LLC: 19/624 | | | Merger - SWN | Assignment |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 100 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | LLC: 41/248 | pany TH Exploration | Properties Inc to | older Onshore | Ctatail IICA | LLC: 41/248 | pany TH Exploration | | Statoil USA | | LLC: 41/248 | Properties inc to | | Statoil USA | | LLC: 41/248 | Properties Inc to | older Onshore | Statoil USA | Assignment |
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| Operator's |
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| Well No. |
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| 10°23194 10°18610 10°18614 10°18615 10°18616 10°18625 10°18626 10°19627 | 10*47051.185.1 10*47051.185.2 10*47051.185.3 | | 10*23668 | 10*23539 | 10 23070 | 10*22853 | 10*22851 | 10*22849 | 10*22600 | 10*22599 | 10*22154 | 10*22147 | 10*22052 | 10*21986 | 10*21984 | 10*21971 | 0,617 01 | 10*21970 | 10*21967 | 10*21928 | 10*21927 | € 0°21844 | 10*21842 | 10*21741 | 20*21738 | 10*21575 | 10°21572 | 10*21517 | 10*21488 | 21400 | 10*21342 | 0*21226 | Lease ID | Ww-6A1 Supplement | |
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| ALBERT AND CHRISTOPHER HARTLEY REIL ROBERT YOUNG MICHAEL A WALKER MARK A WALKER CHAD A YOUNG CLADA SULINE WICKHAM CLADA SUE YOUNG CLADA SUE YOUNG CLADA SUE YOUNG CAROLYN I YOUNG | HOMER, ISIMMONS AND GLADYS R SIMMONS LUCINDA RAE ALLEN AND DAVID A ALLEN ANITA DIANE ANTILL AND TERRY ANTILL *FORCE POOL* | IOHN T GAILAHER AND FMILY I GAILAHER | THE ESTATE OF RUTH N LUTHER SUZANNE L WOZNIAK EXECUTRIX | STONE HILL MINERALS HOLDINGS ILC | DALK K BEKISFORD AKA KANDI BEKISFORD | RONALD LEE HENSLEY AND MARY ANN HENSLEY | JOHN J HELLSTERN AND LYNN D HELLSTERN | SIL MCELROY AND SUE MASON MCELROY | AIDEN BOYD YOUNG JENNIFER A YOUNG, PETITIONER | BRYANT R SWIFT AND KATHY SWIFT | ONALD EUGENE ANDERSON | LARRY R BONAR AND DEBRA L BONAR | DNALD R YOUNG | RONALD D KOONTZ & BETH ANN KOONTZ | SANFORD METZ | KITTELBERGER | MARY LOU KITTELBERGER AND FREDERICK W | ADISTO BUEB DALIGUEBTY & IENNIEED B DALIGUEBTY | ROGER G ALLEN AND DONNA KAY ALLEN | OHN D COX AND CONNIE J COX | BLACK GOLD GROUP LTD | OBERTA YOUNG | JOSEPH NOKOVICH | HOLLY A YOUNG | CRYSTAL DAWN YOUNG | MICHAEL S OTT AND SYBIL OTT | CARLA J SIMMS | SUSAN C YOUNG | ALEXA B YOUNG | ENNIS REASBECK AND BARBARA REASBECK | LELAND SINCLAIR YOUNG | PENNY YODER AND KEVIN LYNN YODER | Grantor, Lessor, Etc. | | |
| JS ROGERS TH SEPICATION LLC TH EXPLORATION LLC | TH EXPLORATION LLC TH EXPLORATION LLC TH EXPLORATION LLC | THE SIN DIL CO | TH EXPLORATION LLC | TH EXPLORATION LLC | IH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | IN EXPLORATION LLC | TU EVBI OBATION IIC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | Grantee, Lessee, Etc. | | |
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| S Rogers to N S South Penn Oil Company: 60/162 2 N/A | N/A N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | Ιľ | Assignment | | |
| South Penn Oil Company to South Penn South Penn South Penn NA N/A N/A N/A N/A N/A N/A N/A N/A N/A | N/A | | N/A | N N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ssignment | | |
| Unrecorded Intransfer - South Perm Oil Company to Hope Matural Gas Company-ARTI in/to the gas Interested rights Intransfer - South Intransfer - So | N/A N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | × , | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | | |
| South Penn Natural Gas Company to Dalls Snyder and Sam Beren: 239/81; | N/A N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | il | | ı | H | - | | П | | 1 | П | - | ł | 1 | N/A | - [| | |
| Dallis Snyder, et ux & Sam Bereun et ux, et al to and George F. Eagon: 1/443 N/A | N/A N/A N/A | *FORC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 2 | N/A | N/A | N/A | N/A | N/A | N/A | A/N | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | | |
| John H. Robinson Eagon Estate, et al to Elva Robinson & Mary Ellen Davis: 3/495 N/A | N/A | *FORCE POOL* | N/A | Z Z | . N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | ш | | | | | | | | | | | | | N/A | | | |
| Elva Robinson & Mary Ellen Davis to Andrew L Henry, Charles E. Reed & Harry R. Contin Ir.: 4/35 N/A | N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 7/2 | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | Office | , |
| Katherine A Henry & Harry E. Cronin Jr. to Cronin Jr. to Crarles E Reed & Kathryn C. Reed: 397/495 N/A | N/A N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | W/A | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NO NAVA | 2 (1807) | News. | Assignment | office of 7 7016 | とくなく |
| , kaitryn C. Reed, widow to Carl Peritins: 434/441 N/A | N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1/2 | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | OVO N/A | A SECOND | office of 7 2019 | 7 |
| Carl D. Perkins & Dorothy Louise Perkins to Perkins & Per | N/A N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 3,3 | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | , | |
| Hope Natural Gas Company to Consolidated Gas Supply Gorp: 374/234 N/A | N/A N/A | The Sun Oil Co to The Wheeling Natural Gas Co: | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 14/2 | z A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | | |
| CNIG Company Company Company MA N/A N/A N/A N/A N/A N/A N/A | N/A | The \ Natura Manu Light & | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 7/2 | Z | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | | |
| CNG Producing Company cnaged its name to Dominion Exploration and Production inc. N/A | N/A N/A | The Mar Light & H M. Snidt Snider di | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | Operator' | |
| Dominion Exploration and Production inc charged its name to Consol Gas Company: 19/546 N/A | | Smider & Kathleen Rinehart, partners dba Hundred Gas Company to Hundred Gas Company, a corp: | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | Operator's Well No. <u>Keith Stern S - 17HU</u> | |
| Consol Gas Company marged Into CNX Gas Company ILC: 11/415 N/A | | Hun Comp D. F 451 | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | W/W | 2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment | Keith Ste | |
| ed CIX Gas Company LLC to Company LLC to TH Exploration LLC. 42/149 LLC. 42/14 | N/A N/A | Carl D. Perkin | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | 1 | ΙI | | 1 | | - 1 | 1 | ΙI | - [| 1 | 1 | N/A | - 1 | <u>rn S - 17</u> | |

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| Granto_Lissor_Ebc. Granto_ | | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | 9-19-2 | Parcel |
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| Royality Deed Book/Page Deed Book/ | | RONALD R YOUNG | PENNY YODER AND KEVIN LYNN YODER | SHIRLEY KOONTZ POA KELLI KOONTZ BENLINE | GRANT D RICHARDS AND KERRI S RICHARDS | HOLLY A YOUNG | CRYSTAL DAWN YOUNG | MICHAELS OTT AND SYBIL OTT | ALICE F WINLAND | CARLA J SIMMS | LARRY R BONAR AND DEBRA L BONAR | SUSAN C YOUNG | ALEXA B YOUNG | LELAND SINCLAIR YOUNG | MELISSA D FLETCHER & SCOTT A FLETCHER | RONALD R YOUNG AND GERALDINE YOUNG | RONALD W YOUNG | Grantor, Lessor, Etc. |
| Deed Book/Fage Assignment Ass | | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | TH EXPLORATION LLC | Grantee, Lessee, Etc. |
| Assignment Assignm | | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | 1/8+ | Royalty |
| Assignment Assignm | | 960 | 952 | 957 | 957 | 957 | 957 | 957 | 957 | 957 | 957 | 949 | 957 | 945 | 938 | 937 | 937 | Deed Bool |
| Assignment Assignm | | 584 | 356 | 454 | 456 | 415 | 413 | 446 | 395 | 397 | 399 | 203 | 299 | 649 | 316 | 368 | 373 | |
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| Assignment Ass | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| R Assignment | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| Assignment | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| Assignment Assignment Assignment Assignment N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| Assignment Assignment N/A N/A N/A N/A N/A N/A N/A N/ | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| Assignment N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |
| Assignment N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | |
| | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Assignment |

9-19-2 M AIDEN BOYD YOUNG JENNIFER A YOUNG, PETITIONER TH EXPLORATION LLC | 1/8+ | 966 | 462 |



DPS LAND SERVICE 6000 TOWN CENTER BLVD STE 145 CANONSBURG, PA 15317-5841

BOOK 0 0 3 6 PAGE 0 1 4 8

STATE OF WEST VIRGINIA \$ \$ COUNTY OF MARSHALL \$

Jan Pest MARSHALL County 12:43:01 PM Instrument No 1404876 Date Recorded 05/20/2016 Document Type ASN Pages Recorded 20 Book-Page 36-148 Recording Fee \$20.00 Additional \$8.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 17th day of May, 2016 (the "Effective Date"), by and between CHEVRON U.S.A. INC. (hereinafter "Assignor") and TH EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated May 2, 2016 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to those certain Oil and Gas Leases situated in Marshall County, West Virginia, as described in Exhibit "A", and as depicted in Exhibits "A-1" and "A-2", attached hereto and made a part hereof (hereinafter the "Leases"); and

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases as described below.

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

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon, except that Assignor accepts and reserves from this Assignment the Chevron ORRI previously conveyed to Assignor and as described in that certain Memorandum of Assignment of Oil and Gas Lease Interests dated November 6, 2012 by and between Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia.

TO HAVE AND TO HOLD such right, title and interest in and to the Leases unto Assignee or its designee, and their respective successors and assigns, forever, in accordance with the provisions of this Assignment.

2. Special Warranty. Assignor represents and warrants that Assignor has not conveyed or otherwise encumbered (other than Permitted Encumbrances) its interest in the Conveyed Interests since the time that Assignor obtained its interests in the Leases. Assignor does covenant, promise and agree, to and with the Assignee, its respective successors and assigns, to forever specially warrant and defend the title to the Leases or portions thereof included under this Assignment, unto the Assignee and its respective successors and assigns, against the lawful claims of Assignor, and all persons claiming, or to claim, the same or any part thereof, by, through or under Assignor.

#217 for now



ASHLEY FAVINGER
AMERICAN PETROLEUM PARTNERS OPERATING LLC
4600 J BARRY COURT STE 310
CANONSBURG PA 15317-5854

BOX 0042 ME0109

STATE OF WEST VIRGINIA

COUNTY OF MARSHALL

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 18th day of May, 2018, and made effective December 12, 2017 (the "Effective Date"), by and between AMERICAN PETROLEUM PARTNERS OPERATING, LLC, (hereinafter "Assignor") and TH EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated December 12, 2017 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

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

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right; title, and interest in and to the Leases as described below.

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

1. <u>Assignment.</u> Assignor does hereby grant, bargain, sell, convey deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon.

TO HAVE AND TO HOLD such right, title and interest in and to the Leases unto Assignee or its designee, and their respective successors and assigns, forever, in accordance with the provisions of this Assignment.

2. <u>Special Warranty</u>. Assignor represents and warrants that Assignor has not conveyed or otherwise encumbered (other than Permitted Encumbrances) its interest in the

Marshall County
Jan Pest, Clerk
Instrument 1440860
05/25/2018 @ 02:36:09 PM
ASSIGNMENTS
Book 42 @ Page 109
Pages Recorded 9
Recording Cost \$ 15.00

Office of Oil and Gas

AUG 27 2019

Environmental Protection

BBK 0042 MEO 140

PARTIAL ASSIGNMENT OF OIL AND GAS LEASES

WHEREAS, Assignor desires to assign all of Assignor's right, title and interest in and to those Oil and Gas Lease(s) as same may have been previously or will in the future be modified, extended, or amended (hereinafter, "Lease" or "Leases"), covering certain tracts of land (hereinafter, "Lands") located in Marshall County, West Virginia; such Leases and Lands covered thereby being more particularly described on Exhibit "A" attached hereto and made a part hereof insofar and only insofar as such Leases cover the Target Formations (as defined below).

NOW, THEREFORE, for and in consideration of Ten and No/100 DOLLARS (\$10.00) and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Assignor does hereby GRANT, BARGAIN, ASSIGN, TRANSFER, AND CONVEY unto Assignee the following "Assigned Rights":

- (a) All of Assignor's right, title, and interest in and to those Leases set forth on <u>Exhibit A</u> attached hereto INSOFAR AND ONLY INSOFAR as to the particular Target Formation(s) (defined below) described and delineated on <u>Exhibit A</u> for each Lease:
 - i. "Target Formation(s)" means, with respect to each Lease, two hundred feet (200') above the top and two hundred feet (200') below the base of the Marcellus Formation or the Utica Formation or both, as specified for each Lease on Exhibit A. For the purposes of this Assignment, the Marcellus Formation shall be defined as the formation commonly known as the Marcellus Shale Formation, with the top of the Marcellus Shale Formation defined as the correlative stratigraphic equivalent to that point found at 6517 feet (6517') measured depth on the Halliburton Simms U-5H Composite DLL DEN NEU Log dated June 14, 2014 (the "Log")



ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "Assignment") is from STATOIL USA ONSHORE PROPERTIES INC., a Delaware corporation ("Assignor"), to TH Exploration, LLC, a Texas limited liability company ("Assignee"), and is executed on August 22, 2016 (the "Effective Date"). Assignor and Assignee may be referred to herein collectively as the "Parties," or individually as a "Party." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated June 19, 2016 (the "Acreage Trade Agreement").

ARTICLE 1 ASSIGNMENT OF ASSETS

Section 1.1 <u>Assignment</u>. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on <u>Exhibit A</u> attached hereto (the "Leases") INSOFAR AND ONLY INSOFAR as they cover the Target Formations and INSOFAR AND ONLY INSOFAR as they cover those lands described on <u>Exhibit A</u> (the "Leasehold Rights") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "Conveyed Assets"). Assignor does hereby reserve unto itself the right and subsurface easement to drill through the Leasehold Rights to access the those depths and formations in the Leases other than the Target Formations and (y) to shoot seismic, sonic, or other energy or waves through the Leasehold Rights and to receive, record and evaluate such energy or waves, including those reflected from or in any way pertaining to the reserved depths, and to utilize any and all other exploration technologies that image the subsurface of the leasehold including the reserved depths and to receive, record and evaluate all images resulting therefrom.

TO HAVE AND TO HOLD the Conveyed Assets, together with all and singular the rights, privileges, contracts and appurtenances, in any way appertaining or belonging thereto, unto Assignee, its successors and assigns, forever, subject, to the terms and conditions of this Assignment.

Section 1.4 Assignment Subject to Acreage Trade Agreement. This Assignment is made in accordance with and is subject to the terms, covenants and conditions contained in that certain Acreage Trade Agreement. In the event of a conflict between the provisions of the Acreage Trade Agreement and this Assignment, the provisions of the Acreage Trade Agreement shall control. The execution and delivery of this Assignment by Assignor, and the execution and acceptance of this Assignment by Assignee, shall not operate to release or impair any surviving rights or obligations of either Party with respect to the other under the Acreage Trade Agreement.

ARTICLE 2 SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

Section 2.1 <u>Special Warranty of Title.</u> Assignor hereby agrees to warrant and defend Defensible Title to the Leases unto Assignee, its successors and assigns, against every Person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Assignor or any of its Affiliates, but not otherwise.

Section 2.2 <u>Disclaimers of Warranties and Representations.</u>

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN <u>SECTION VI</u> OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR WARRANTY, EXPRESS, IMPLIED OR STATUTORY, INCLUDING AS TO (I) TITLE TO THE LEASEHOLD RIGHTS, (II) THE CONTENTS, CHARACTER OR NATURE OF ANY



MIXE 04 | PAGE 0256

ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "Assignment") is from SWN PRODUCTION COMPANY, LLC, a Texas limited liability company ("Assignor"), to TH Exploration, LLC, a Texas limited liability company ("Assignee"), and is executed on December 18, 2017 (the "Effective Date"). Assignor and Assignee may be referred to herein collectively as the "Parties," or individually as a "Party." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated August 24, 2017 (the "Acreage Trade Agreement").

ARTICLE 1 ASSIGNMENT OF ASSETS

Section 1.1 Assignment. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on Exhibit A attached hereto (the "Leases") INSOFAR AND ONLY INSOFAR as they cover those lands described on Exhibit A (the "Leasehold Rights") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "Conveyed Assets").

TO HAVE AND TO HOLD the Conveyed Assets, together with all and singular the rights, privileges, contracts and appurtenances, in any way appertaining or belonging thereto, unto Assignee, its successors and assigns, forever, subject, to the terms and conditions of this Assignment.

Section 1.2 <u>Assignment Subject to Acreage Trade Agreement</u>. This Assignment is made in accordance with and is subject to the terms, covenants and conditions contained in that certain Acreage Trade Agreement. In the event of a conflict between the provisions of the Acreage Trade Agreement and this Assignment, the provisions of the Acreage Trade Agreement shall control. The execution and delivery of this Assignment by Assignor, and the execution and acceptance of this Assignment by Assignee, shall not operate to release or impair any surviving rights or obligations of either Party with respect to the other under the Acreage Trade Agreement.

ARTICLE 2 SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

Section 2.1 Special Warranty of Title. Assignor hereby agrees to warrant and defend Defensible Title to the Leases unto Assignee, its successors and assigns, against every Person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Assignor or any of its Affiliates, but not otherwise.

Section 2.2 <u>Disclaimers of Warranties and Representations</u>.

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN <u>SECTION</u> <u>VI</u> OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR

Office of Oil and Gas
AUG 27 2019

Environmental Protection



August 3, 2018

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

RE: Keith Stern S-17HU

Subject: Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Keith Stern N-13HU well plat.

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

Sincerely,

Amy L. Miller

anystull

Permitting Specialist - Appalachia Region

Office Of Oil and Gas

AUG 27 2019

Environmental Protection

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

| | ce Certification: 08/22/2019 | | API No. 47 | | |
|--|---|--|---|--|--|
| | | | | Well No. Keith Name: Keith St | |
| Notice has | heen given: | 3 | ven rad r | vame | 6111 |
| Pursuant to th | ne provisions in West Virginia Code | § 22-6A, the Operator has provide | ded the req | juired parties v | vith the Notice Forms listed |
| | tract of land as follows: | | | 500 71900 | |
| State: | West Virginia | | Easting: | 526,366.85 4,402,804.81 | |
| County: District: | Marshall Meade | Public Road Acces | Northing: | | (County Route 74) |
| Quadrangle: | Glen Easton 7.5' | Generally used far | | TH Exploration, L | |
| Watershed: | Fish Creek (HUC 10) | Generally listed fair | iii iidiiie. | 3.1.m.p | |
| information r of giving the requirements Virginia Cod | ed the owners of the surface descrequired by subsections (b) and (c), surface owner notice of entry to of subsection (b), section sixteen e § 22-6A-11(b), the applicant shall have been completed by the applications. | section sixteen of this article; (ii) survey pursuant to subsection (a) of this article were waived in w tender proof of and certify to the | that the red), section to writing by | quirement was ten of this arti the surface ov | deemed satisfied as a result ele six-a; or (iii) the notice vner; and Pursuant to West |
| Pursuant to that the Ope | West Virginia Code § 22-6A, the Crator has properly served the require | perator has attached proof to this red parties with the following: | s Notice C | ertification | OOG OFFICE USE |
| | | | | | |
| *PLEASE CHI | ECK ALL THAT APPLY | | | | ONLY |
| | ECK ALL THAT APPLY FICE OF SEISMIC ACTIVITY 0 | F NOTICE NOT REQUIRE SEISMIC ACTIVITY WAS (| | and the same of th | |
| ☐ 1. NO | | SEISMIC ACTIVITY WAS | CONDUC" | TED | ONLY RECEIVED/ |
| 1. NO | TICE OF SEISMIC ACTIVITY o | SEISMIC ACTIVITY WAS O | CONDUC Y WAS CO ED BECAU | TED ONDUCTED JSE | ONLY RECEIVED/ NOT REQUIRED |
| 1. NO | TICE OF SEISMIC ACTIVITY O | SEISMIC ACTIVITY WAS OVER OF NO PLAT SURVEY NOTICE NOT REQUIRE NOTICE OF ENTRY FOR PL | CONDUC Y WAS CO ED BECAL AT SURV | TED ONDUCTED JSE VEY | ONLY RECEIVED/ NOT REQUIRED RECEIVED/ |
| ☐ 1. NO | TICE OF SEISMIC ACTIVITY O | SEISMIC ACTIVITY WAS OVEY OF NO PLAT SURVEY NOTICE NOT REQUIRE NOTICE OF ENTRY FOR PLEWAS CONDUCTED OF WRITTEN WAIVER BY (PLEASE ATTACH) | CONDUC Y WAS CO ED BECAL AT SURV | TED ONDUCTED JSE VEY | ONLY RECEIVED/ NOT REQUIRED RECEIVED/ |
| □ 1. NO' □ 2. NO' □ 3. NO' □ 4. NO' | TICE OF SEISMIC ACTIVITY OF | SEISMIC ACTIVITY WAS OVEY OF NO PLAT SURVEY NOTICE NOT REQUIRE NOTICE OF ENTRY FOR PLEWAS CONDUCTED OF WRITTEN WAIVER BY (PLEASE ATTACH) | CONDUC Y WAS CO ED BECAL AT SURV | TED ONDUCTED JSE VEY | ONLY RECEIVED/ NOT REQUIRED RECEIVED/ NOT REQUIRED |

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

WW-6AC (1/12)

Certification of Notice is hereby given:

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

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

Telephone: 724-749-8388 Address: 380 Southpointe Boulevard, Plaza II, Suite 200

Canonsburg, PA 15317 Facsimile: 724-338-2030

Email: amiller@tug-hillop.com

NOTARY SEAL

Commonwealth of Pennsylvania - Notary Seal MAUREEN A STEAD - Notary Public Washington County My Commission Expires Jan 28, 2023 Commission Number 1259926

Subscribed and sworn before me this 22 day of AUGUST, 2019.

Notary Public

My Commission Expires

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.

Environmental Protection

WW-6A (9-13) API NO. 47- 051 OPERATOR WELL NO. Keith Stern S-17HU
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.

| BOO AND AND ADDRESS OF THE PARTY OF THE PART | 1. company | |
|--|---|--------------------------------------|
| Date of Notice: 6/3/2019 Date Permit Application File | d: <u>8/22/2019</u> | |
| Notice of: | | |
| ✓ PERMIT FOR ANY ☐ CERTIFICATE O | F APPROVAL FOR THE | |
| | | |
| WELL WORK CONSTRUCTION | N OF AN IMPOUNDMENT OR PIT | |
| Delivery method pursuant to West Virginia Code § 22- | 6A-10(b) | |
| ☐ PERSONAL ☐ REGISTERED ☑ M | METHOD OF DELIVERY THAT REQUIRES A | |
| SERVICE MAIL I | RECEIPT OR SIGNATURE CONFIRMATION | |
| sediment control plan required by section seven of this article the surface of the tract on which the well is or is proposed to oil and gas leasehold being developed by the proposed well well described in the erosion and sediment control plan submitted operator or lessee, in the event the tract of land on which the more coal seams; (4) The owners of record of the surface trace well work, if the surface tract is to be used for the placement, impoundment or pit as described in section nine of this article have a water well, spring or water supply source located with provide water for consumption by humans or domestic animal proposed well work activity is to take place. (c)(1) If more that subsection (b) of this section hold interests in the lands, the agreeords of the sheriff required to be maintained pursuant to seprovision of this article to the contrary, notice to a lien holder | exceipt or signature confirmation, copies of the application, the erosion and e, and the well plat to each of the following persons: (1) The owners of record be located; (2) The owners of record of the surface tract or tracts overlying work, if the surface tract is to be used for roads or other land disturbance as pursuant to subsection (c), section seven of this article; (3) The coal owner well proposed to be drilled is located [sic] is known to be underlain by one of the ortracts overlying the oil and gas leasehold being developed by the proposed construction, enlargement, alteration, repair, removal or abandonment of a etc. (5) Any surface owner or water purveyor who is known to the applicant of in one thousand five hundred feet of the center of the well pad which is used in three tenants in common or other co-owners of interests described in an three tenants in common or other co-owners of interests described in pplicant may serve the documents required upon the person described in the cetton eight, article one, chapter eleven-a of this code. (2) Notwithstanding is not notice to a landowner, unless the lien holder is the landowner. W. V. also provide the Well Site Safety Plan ("WSSP") to the surface owner and esting as provided in section 15 of this rule. | the r, c or posed any to ed to |
| ☐ Application Notice ☐ WSSP Notice ☐ E&S Plan N | Notice ☑ Well Plat Notice is hereby provided to: | |
| ☑ SURFACE OWNER(s) | COAL OWNER OR LESSEE | |
| Name: TH Exploration, LLC (Access Road and Well Pad) | Name: CONSOL Energy, Inc. Attn: Casey Saunders | |
| Address: 380 Southpointe Boulevard, Plaza II, Suite 200 | Address: 1000 CONSOL Energy Drive | |
| Canonsburg, PA 15318 | Canonsburg, PA 15317 | |
| Name: | ☐ COAL OPERATOR | |
| Address: | Name: | |
| | Address: | |
| SURFACE OWNER(s) (Road and/or Other Disturbance |) | D= |
| Name: | ☑ SURFACE OWNER OF WATER WELL Office | RECEIVED |
| Address: | AND/OR WATER PURVEYOR(s) | RECEIVED of Oil and Gas |
| N | Name: *See attached list AUG | 27 - Gas |
| Name: | Address: | 2019 |
| Address: | Environ Dep | artm |
| SURFACE OWNER(s) (Impoundments or Pits) | Name: _*See attached list AUG Address: | tal prote of |
| | Address: | ection |
| Name:Address: | Address: | |
| Audi 655. | *Please attach additional forms if necessary | |
| | rease attach additional forms if necessary | |

WW-6A (8-13)

API NO. 47-051

OPERATOR WELL NO. Keith Stern S-17HU

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 Environmentalice of Oil Street SE. Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-AUG Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environment of Environment

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 rotection

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. (c) 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

WW-6A (8-13)

API NO. 47-051

OPERATOR WELL NO. Keith Stern S-17HU

Well Pad Name: Keith Stern

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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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.

WW-6A (8-13) API NO. 47- 051

OPERATOR WELL NO, Keith Stem S-17HU

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)

705 102266

OPERATOR WELL NO. Keith Stern S-17HU Well Pad Name: Keith Stern

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC

Telephone: 724-749-8388

tuller Email: amiller@tug-hillop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200

Canonsburg, PA 15317

Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

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

Commonwealth of Pennsylvania - Notary Seal MAUREEN A STEAD - Notary Public Washington County My Commission Expires Jan 28, 2023 Commission Number 1259926

Subscribed and sworn before me this 2 day of MAY 2019.

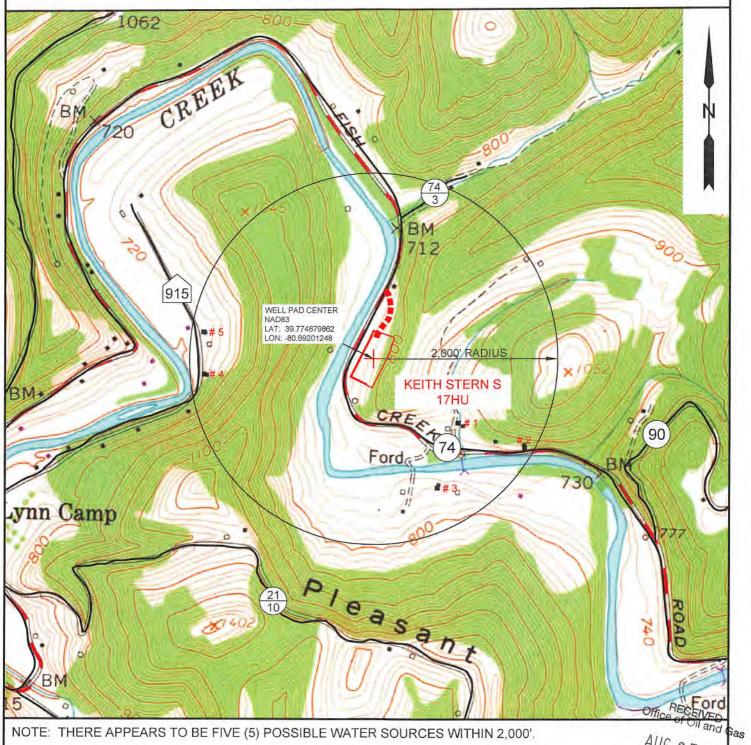
My Commission Expires 1/28/23

Environmental Protection

WW-6A

PROPOSED KEITH STERN S - 17HU

SUPPLEMENT PG. 1B



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

AUG 27 2019



Land & Energy Development

Solutions from the ground up.

2.0, Box 150 •12 Vanhorn Drive • Glenville, WV 26351 • (304) 462-55;

www.sissurveys.com

| | TOPO SI | ECTION: | OPER. | ATOR: |
|-----|----------|-----------|-------------------------|------------|
| | GLEN EAS | STON 7.5' | PREPARED FO | |
| | COUNTY | DISTRICT | 380 SOUTHPOI | NTE BLVD |
| | MARSHALL | MEADE | SUITE 200 CANONSBURG | , PA 15317 |
| 34 | DRAWN BY | JOB NO. | DATE | SCALE |
| 134 | K.G.M. | 8811 | 05/01/2019 | 1" - 1000' |



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 - 17HU

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



WW-70 Rev. 7/01

Affidavit of Personal Service

| State Of Pennsylvania |
|--|
| County Of Washington |
| The undersigned, being first duly sworn, says that the undersigned served a true and complete copy of all sides of |
| (1) Notice on Form WW-2(A) / WW-3(A) / WW-4(A) / WW-5(A) / WW-6(A) X / WW-6(B) / WW-4(B) / WW-5(B) / WW-6(B) / WW-6(|
| all with respect to operator's Well No. Keith Stem N-14HU located in Meade District, Marshall County, West Virginia, upon the person or organization named |
| TH Exploration, LLC |
| by delivering the same in Washington County, State of Pennsylvania |
| on the 3md day of June , 20 0 in the manner specified below. |
| [COMPLETE THE APPROPRIATE SECTION] |
| For an individual: [] Handing it to him _ / her _ / or, because he _ / she _ / refused to take it when offered it, by leaving it in his _ / her _ / presence. |
| [] Handing it to a member of his or her family above the age of 16 years named who resides at the usual place of abode of the person to be served, and asking the family member to give it to the person to be served as soon as possible. |
| For a partnership: [] Handing it to |
| For a limited partnership: [] Handing it to the general partner, named, or, because the general partner refused to take it when I tried to hand it over, by leaving it in the presence of the general partner. |
| For a corporation: [] Handing it to the corporation's employee // officer // director // attorney in fact // named David Delallo |
| (Signature of person executing service) |
| Taken, subscribed and sworn before me this |
| (AFFIX SEAL IF NOTARIZED OUTSIDE THE STATE) Commonwealth of Pennsylvania - Notary Seal MAUREEN A STEAD - Notary Public Washington County My Commission Expires Jan 28, 2023 Commission Number 1259926 |

Office of Oil and Gas

AUG 27 2019

WW Department of Environmental Protection

WW-6A3 (1/12) Operator Well No. Keith Stern S-17HU

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

| PERSONAL REGISTERED METHOD OF DELIVERY THAT REQUIRES A SERVICE MAIL RECEIPT OR SIGNATURE CONFIRMATION ursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days at no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams eneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any ware of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosia of Sediment Control Manual and the statutuse and rules related to oil and gas exploration and production may be obtained from the exerctary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to hable the surface owner to obtain copies from the secretary. SURFACE OWNER(s) ame: Survey of Sur | | ce: 12/11/17 Date of | Planned Entry: 12/18/17 | | | |
|--|---|--|--|--|---|---|
| PERSONAL REGISTERED MAIL RECIPTOR SIGNATURE CONFIRMATION Tursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry no the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days un no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams eneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosia of Sediment Control Manual and the statutes and rules related to oil and agas exploration and production and production mable the surface owner to obtain copies from the secretary. **Source: The Exploration. LIO Process Read and Well Pad) (Address: 380 Southpoints Bouleward, Plaza I), Splin 200 Canonsburg, PA 15318 **Surre: Happending LIO Process Read and Well Pad) (Address: 4912 Fish Cones Read (Address: 4912 Fish Cones Fish (Addres | Delivery met | | | | | |
| Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry no to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosiand Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to mable the surface owner to obtain copies from the secretary. Notice is hereby provided to: SURFACE OWNER(s) Name: The Exploration, LLC (Access Read and Well Pad) Address: SOS Southpointe Bouleward. Plaza II, Silia 200 Canonaburg. PA 15318 Name: Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: William K and Bettl. Littern Address: MINERAL OWNER(s) Name: Wi | | <u> </u> | | HARDY BULLED | COLUMBER | |
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| unt to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary. Notice is hereby provided to: SURFACE OWNER(s) SURFACE OWNER(s) Name: | SERVIC | E MAIL | RECEIPT OR SIG | NATURE CONFIR | CMATION | |
| Name: TH Exploration, LLC (Access Road and Weil Pad) Address: 380 Southpointe Boulevard, Plaza II, Shite 200 Canonsburg, PA 15318 Name: MINERAL OWNER(s) Name: William K. and Betty L. Stern Address: 14912 Fish Creek Road Glen Easton, W 26039 *please attach additional forms if necessary Notice is hereby given: Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia Public Road Access: Fish Creek Road (County Route 74) District: Meade Watershed: Fish Creek Road (County Route 74) Quadrangle: Glen Easton 7.5° Generally used farm name: TH Exploration, LLC Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx. Notice is hereby given by: Well Operator: Tug Hill Operating, LLC Address: 380 Southpointe Boulevard, Plaza II, Suite 200 Canonsburg, PA 15317 AUG 2 | on to the surfi but no more t beneath such owner of min and Sediment Secretary, wh | ace tract to conduct any plat sur han forty-five days prior to such tract that has filed a declaration erals underlying such tract in the Control Manual and the statute ich statement shall include cont | veys required pursuant to this an entry to: (1) The surface owner pursuant to section thirty-six, are county tax records. The notices and rules related to oil and gate act information, including the are | rticle. Such notice er of such tract; (2) article six, chapter to be shall include a st s exploration and p | shall be provided at least to any owner or lessee of wenty-two of this codes atement that copies of the orduction may be obtain | st seven days of coal seams and (3) any he state Erosion ned from the |
| Name: TH Exploration, LLC (Access Road and Weil Pad) Address: 380 Southpointe Boulevard, Plaza II, Shite 200 Canonsburg, PA 15318 Name: MINERAL OWNER(s) Name: William K. and Betty L. Stern Address: 14912 Fish Creek Road Glen Easton, W 26039 *please attach additional forms if necessary Notice is hereby given: Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia Public Road Access: Fish Creek Road (County Route 74) District: Meade Watershed: Fish Creek Road (County Route 74) Quadrangle: Glen Easton 7.5° Generally used farm name: TH Exploration, LLC Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx. Notice is hereby given by: Well Operator: Tug Hill Operating, LLC Address: 380 Southpointe Boulevard, Plaza II, Suite 200 Canonsburg, PA 15317 AUG 2 | Notice is her | eby provided to: | 11 1.24 | | | |
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| Name: Address: Name: William K. and Betty L. Stern Address: 14912 Fish Creek Road Glen Easton, WV 26039 *please attach additional forms if necessary Notice is hereby given: Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia Approx. Latitude & Longitude: State: West Virginia Public Road Access: Fish Creek Road (County Roule 74) District: Meade Watershed: Glen Easton 7.5' Generally used farm name: Thexploration, LLC Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx. Notice is hereby given by: Well Operator: Tug Hill Operating, LLC Address: 380 Southpointe Boulevard, Plaza II, Suite 200 Canonsburg, PA 15317 | | | | | | |
| Name: Address: Name: Name: Address: Name: Name: Address: Name: Add | | | | | Energy Drive | |
| Address: MINERAL OWNER(s) Name: Milliam K. and Betty L. Stern Address: 14912 Fish Creek Road Glen Easton, WV 26039 *please attach additional forms if necessary Notice is hereby given: Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia | | | | Canonsburg, PA 15317 | | |
| Name: Name: Address: 14912 Fish Creek Road Glen Easton, WV 26039 | Name: | | ■ MINI | EDAL OWNED(e) | | |
| Name: Address: Addres | Address. | | | | | |
| *please attach additional forms if necessary Notice is hereby given: Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia Approx. Latitude & Longitude: 39.7748867; -80.6920362 County: Marshall Public Road Access: Fish Creek Road (County Route 74) District: Meade Watershed: Fish Creek (HUC 10) Quadrangle: Glen Easton 7.5' Generally used farm name: TH Exploration, LLC Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx. Notice is hereby given by: Well Operator: Tug Hill Operating, LLC Address: 380 Southpointe Boulevard, Plaza II, Suite 200 Felephone: 724-749-8388 Canonsburg, PA 15317 AUG 2 | Name: | | Address: | | | |
| *please attach additional forms if necessary Notice is hereby given: Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows: State: West Virginia Approx. Latitude & Longitude: 39.7748867; -80.6920362 County: Marshall Public Road Access: Fish Creek Road (County Route 74) District: Meade Watershed: Fish Creek (HUC 10) Quadrangle: Glen Easton 7.5' Generally used farm name: TH Exploration, LLC Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx. Notice is hereby given by: Well Operator: Tug Hill Operating, LLC Address: 380 Southpointe Boulevard, Plaza II, Suite 200 Canonsburg, PA 15317 AUG 2 | Address: | | | | | |
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| Quadrangle: Glen Easton 7.5' Generally used farm name: TH Exploration, LLC Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57 th Street, SE Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx . Notice is hereby given by: Well Operator: Tug Hill Operating, LLC Address: 380 Southpointe Boulevard, Plaza II, Suite 200 AUG Canonsburg, PA 15317 | Pursuant to Wa plat survey of | Vest Virginia Code § 22-6A-10(a con the tract of land as follows: West Virginia | Approx. Latit | ude & Longitude: | 39.7748867; -80.6920362 Fish Creek Road (County Rout | |
| Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57 th Street, SE Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx . Notice is hereby given by: Well Operator: Tug Hill Operating, LLC Address: 380 Southpointe Boulevard, Plaza II, Suite 200 AUG Canonsburg, PA 15317 | County: | Meade | | | | |
| Canonsburg, PA 15317 | State: | | Public Road | | Fish Creek Road (County Rout Fish Creek (HUC 10) | te 74) |
| Canonsburg, PA 15317 | Copies of the may be obtain Charleston, W | state Erosion and Sediment Conted from the Secretary, at the W/V 25304 (304-926-0450). Cop | Generally use atrol Manual and the statutes an V Department of Environmentations of such documents or additional attentions. | d rules related to o al Protection headq ional information r | il and gas exploration a uarters, located at 601 5 | 7 th Street, SE, ling may be |
| Canonsburg, PA 15317 | County: District: Quadrangle: Copies of the may be obtain Charleston, W obtained from | state Erosion and Sediment Conted from the Secretary, at the W/V 25304 (304-926-0450). Cop the Secretary by visiting www.reby given by: | Generally use atrol Manual and the statutes an V Department of Environmentatics of such documents or addit dep.wv.gov/oil-and-gas/pages/ | d rules related to o al Protection headq ional information r | il and gas exploration a uarters, located at 601 5 | 7 th Street, SE, ling may be |
| | County: District: Quadrangle: Copies of the may be obtain Charleston, W obtained from Notice is he Well Operator | state Erosion and Sediment Conted from the Secretary, at the W/V 25304 (304-926-0450). Cop the Secretary by visiting www.reby given by: | Generally use atrol Manual and the statutes an V Department of Environmentatics of such documents or addit dep.wv.gov/oil-and-gas/pages/ | d rules related to on Protection headq ional information redefault.aspx. | il and gas exploration a uarters, located at 601 5 elated to horizontal dril | 7 th Street, SE, ling may be Office of C |
| Email: Facsimile: 724-338-2030 WW Depa Environments 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 regulators. | County: District: Quadrangle: Copies of the may be obtain Charleston, Wobtained from Notice is her Well Operator Telephone: | state Erosion and Sediment Conted from the Secretary, at the W/V 25304 (304-926-0450). Copthe Secretary by visiting www.reby given by: Tug Hill Operating, LLC | Generally use atrol Manual and the statutes an V Department of Environmentatics of such documents or addit dep.wv.gov/oil-and-gas/pages/ | d rules related to on Protection headq ional information related to the default.aspx. | il and gas exploration a uarters, located at 601 5 elated to horizontal dril | 7 th Street, SE, ling may be Office of C |

needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact

DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

WW-6A5 (1/12) Operator Well No. Keith Stem N-13HU

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

| Notice Time Date of Notice | Requirement: notice shall be provided ce: 06/03/2019 Date Permit | no later than the filing Application Filed: 08/ | | application. | |
|---|---|---|---|---|---|
| Delivery me | thod pursuant to West Virginia Code § | § 22-6A-16(c) | | | |
| ☐ CERTI | FIED MAIL | HAND | | | |
| | RN RECEIPT REQUESTED | DELIVERY | | | |
| return receipt the planned of required to be drilling of a damages to the | W. Va. Code § 22-6A-16(c), no later that requested or hand delivery, give the surpperation. The notice required by this exprovided by subsection (b), section ten horizontal well; and (3) A proposed surple surface affected by oil and gas operatives required by this section shall be given | face owner whose lan- subsection shall inclu- of this article to a surf- face use and compen- ons to the extent the de- | d will be used for de: (1) A copy ace owner whose sation agreement amages are com | or the drilling of a horizon of this code section; (2) se land will be used in con at containing an offer of pensable under article six | ntal well notice of The information njunction with the compensation for -b of this chapter. |
| (at the address Name: TH Explo | | e time of notice): Name: | | | |
| Address: 380 : Canonsburg, PA | Southpointe Boulevard, Plaza II, Suite 200 | Addres | S: | | |
| operation on State: County: District: Quadrangle: | the surface owner's land for the purpose West Virginia Marshall Meade Glen Easton 7.5' | UTM NAD 8 | Easting: Northing: | cet of land as follows: 526,359.50 4,402,804.35 Fish Creek Road (County Route TH Exploration, LLC | 74) |
| Watershed: | Fish Creek (HUC 10) | Generally us | ed farm name, | TH Exploration, LEG | |
| Pursuant to V to be provide horizontal we surface affect information r | Shall Include: Vest Virginia Code § 22-6A-16(c), this need by W. Va. Code § 22-6A-10(b) to a sell; and (3) A proposed surface use and code by oil and gas operations to the extended to horizontal drilling may be obtollocated at 601 57th Street, SE, Charault.aspx. | surface owner whose compensation agreeme ent the damages are co tained from the Secre | e land will be on the containing are compensable und tary, at the WV | used in conjunction with a offer of compensation for the article six-b of this characteristics. | the drilling of a or damages to the napter. Additional mental Protection p.wv.gov/oil-and- |
| Well Operato | T: Tug Hill Operating, LLC | Address: | 380 Southpointe Bo | ulevard, Plaza II, Suite 200 | Office of Off and of |
| Telephone: | 724-749-8388 | | Canonsburg, PA 15 | C.O. | Alla |
| Email: | amiller@tug-hillop.com | Facsimile: | 724-338-2030 | | AUG 27 2000 |
| Oil and Gas The Office of | Privacy Notice: Oil and Gas processes your personal inf | ormation, such as nam | e. address and t | elenhone number, as part | Environmental pert of |

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 deprivacyofficer@wv.gov.

WW-70 Rev. 7/01

Affidavit of Personal Service

| State Of Pennsylvania | |
|--|-----------------------|
| County Of Washington | |
| The undersigned, being first duly sworn, says that the undersigned served complete copy of all sides of | a true and |
| $ \begin{array}{llllllllllllllllllllllllllllllllllll$ | X, WW-CA |
| all with respect to operator's Well No. Keith Stern N-14HU located in Meade District, Marshall County, West Virginia, upon the person or organization | n named |
| TH Exploration, LLC | |
| by delivering the same in Washington County, State of Pennsylvania | |
| on the 3rd day of June, 20 101 in the manner specified below. | |
| [COMPLETE THE APPROPRIATE SECTION] | |
| For an individual: [] Handing it to him/ her/ or, because he/ she/ refused to to offered it, by leaving it in his/ her/ presence. | ake it when |
| [] Handing it to a member of his or her family above the age of 16 years who resides at the usual place of abode of the person | |
| served, and asking the family member to give it to the person to be served as so possible. | on as |
| For a partnership: [] Handing it to | ip or, he presence |
| For a limited partnership: | |
| [] Handing it to the general partner, named because the general partner refused to take it when I tried to hand it over, by in the presence of the general partner. | _, or, leaving it |
| For a corporation: [] Handing it to the corporation's employee/ officer/ director/ in fact/ named David Delallo | attorney |
| (Signature of person executing service) | |
| Taken, subscribed and sworn before me this 7 day of JUNE 2 My commission expires 1/26/23 Motary Public | 0 <u>19</u> . |
| (AFFIX SEAL IF NOTARIZED OUTSIDE THE STATE) Commonwealth of Pennsylvania - Notary Seal MAUREEN A STEAD - Notary Public Washington County My Commission Expires Jan 28, 2023 Commission Number 1259926 | |

Office of Oil and Gas

AUG 27 2019

Environmental Protection



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION **Division of Highways**

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

June 11, 2019

Byrd E. White, III Secretary of Transportation

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

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

Subject: DOH Permit for the Keith Stern Pad, Marshall County Keith Stern S-17HU Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2018-0068 issued to Tug Hill Operating for access to the State Road for a well site located off of Marshall County Route 74 SLS.

This operator is in compliance with §22-6A-20 of the WV Code. Operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated October 1, 2018.

Very Truly Yours,

Gary K. Clayton, P.E.

Regional Maintenance Engineer

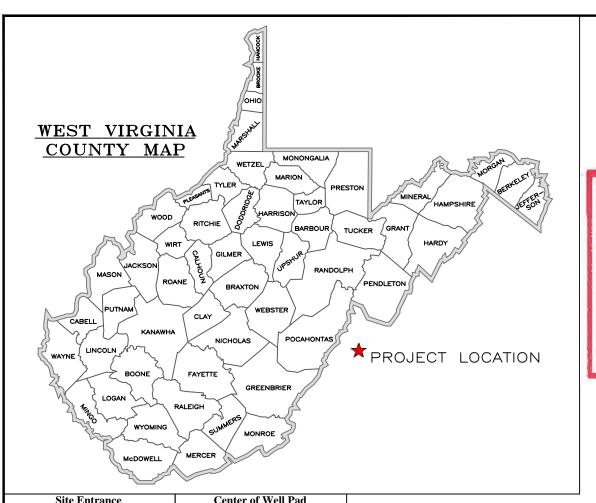
Central Office O&G Coordinator

Cc: Amy Miller Tug Hill Operating

CH, OM, D-6

File

WV Department of Environmental Protection



WV-N NAD 83 E: 1633476.65

WV-N NAD 27 N: 466536.57

Lat. NAD 83: 39.77487986

Lat. NAD 27: 39.77480148

Lon. NAD 83: -80.69201248

Lon. NAD 27: -80.69220434

UTM 17 NAD 83 N: 4402816.93

UTM 17 NAD 83 E: 526375.87 Pad Elev.: 744.65'

<u>N-16HU</u> WV-N NAD 83 N: 466565.02

WV-N NAD 83 E: 1633438.61

WV-N NAD 27 N: 466528.24

WV-N NAD 27 E: 1664875.56

Lat. NAD 83: 39.77485561

Lon. NAD 83: -80.69214745

Lat. NAD 27: 39.77477722

Lon. NAD 27: -80.69233929

WV-N NAD 83 N: 466511.60

WV-N NAD 83 E: 1633411.29

WV-N NAD 27 N: 466474.82

WV-N NAD 27 E: 1664848.24

Lat. NAD 83: 39.77470796

Lon. NAD 83: -80.69224210

Lat. NAD 27: 39.77462958

WV-N NAD 83 N: 466544.78

WV-N NAD 83 E: 1633451.84

WV-N NAD 27 N: 466507.99

WV-N NAD 27 E: 1664888.79

Lat. NAD 83: 39.77480051

Lon. NAD 83: -80.69209941

Lat. NAD 27: 39.77472213

Lon. NAD 27: -80.69229125

Lon. NAD 27: -80.69243394

WVDEP OOG 7/30/2018

> WV-N NAD 83 N: 466607.76 WV-N NAD 83 E: 1633460.46 WV-N NAD 27 N: 466570.98 WV-N NAD 27 E: 1664897.41 Lat. NAD 83: 39.77497372 Lon. NAD 83: -80.69207172 Lat. NAD 27: 39.77489533 Lon. NAD 27: -80.69226357 ΓM 17 NAD 83 (m) N: 4402827.33 TM 17 NAD 83 (m) E: 526370.77

WV-N NAD 83 N: 466597.08 WV-N NAD 83 E: 1633455.00 WV-N NAD 27 N: 466560.29 WV-N NAD 27 E: 1664891.94 Lat. NAD 83: 39.77494419

Lon. NAD 83: -80.69209065 Lat. NAD 27: 39.77486581 Lon. NAD 27: -80.69228250 JTM 17 NAD 83 (m) N: 4402824.04 UTM 17 NAD 83 (m) E: 526369.16

WV-N NAD 83 E: 1633449.53 WV-N NAD 27 N: 466549.61

Keith Stern Well Site

Site Design, Construction Plan, & **Erosion and Sediment Control Plans** Tug Hill Operating Marshall County Meade District Latitude 39.77487986° Longitude -80.69201248°

Pertinent Site Information Keith Stern Well Site Emergency Number: 304-845-1920 Meade District, Marshall County, WV Watershed: Middle Fish Creek Watershed Site 911 Address:

Tug Hill Contact Number: 1-817-632-3400

| Property Owner Information - Keith Stern Well Site | | | | | | | | | |
|--|-----------|----------|-------------|----------------|---------------|-------------|--|--|--|
| Meade District - Marshall County | | | | | | | | | |
| Owner | TM-Parcel | Well Pad | Access Road | Topsoil/Excess | Add. Clearing | Total Distu | | | |
| Tug Hill Operating, LLC | 14-24.1 | 4.32 | 0.73 | 0.50 | 4.80 | 10.35 | | | |
| | | | | | | | | | |

Site Totals (Ac) 4.32 0.73 0.50 4.80

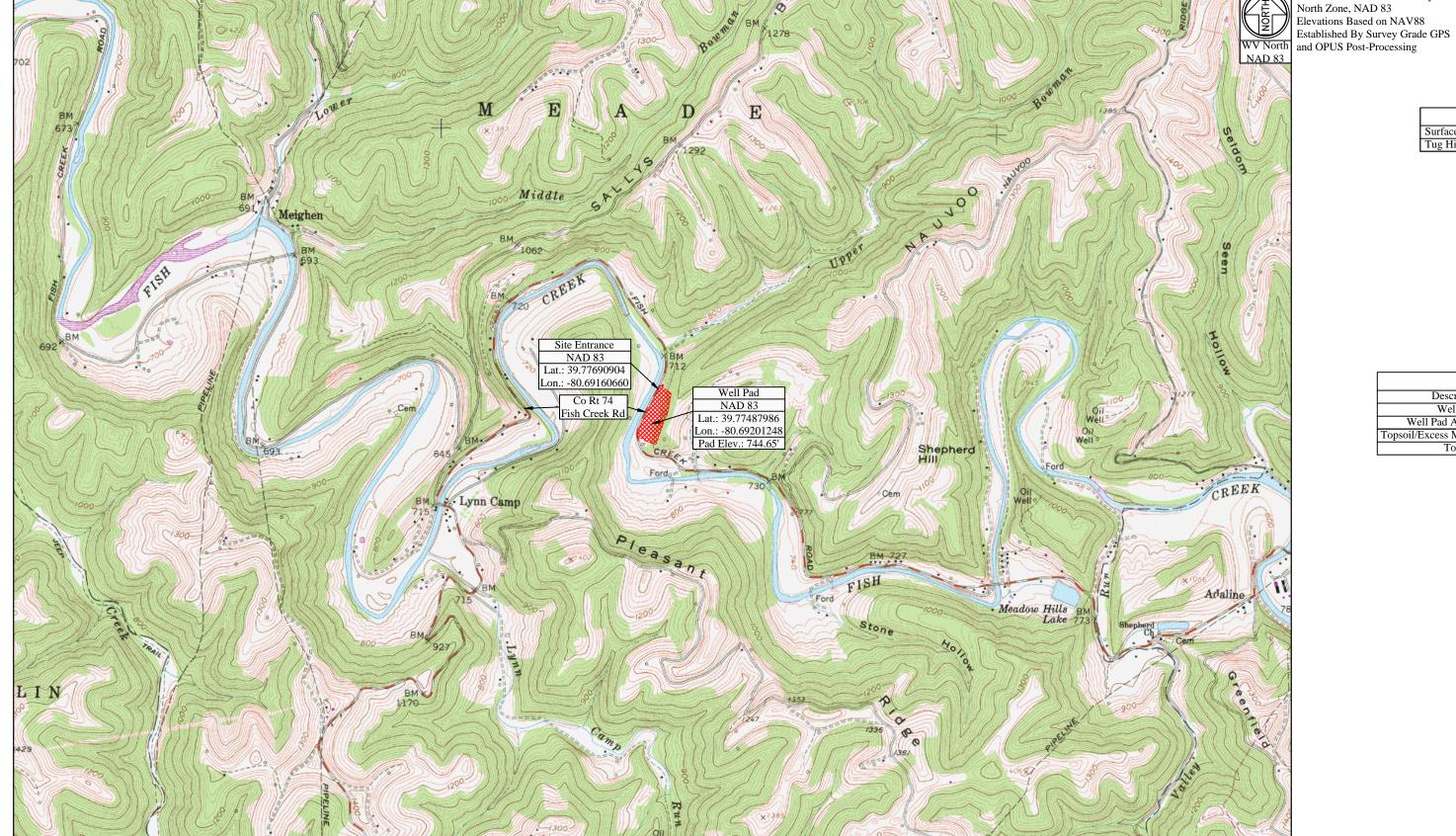
Access Road

Cotal Wooded Acres Disturbed 4.81 Ac

Keith Stern Well Site Quantities

Exhibit A: Final Design: Issue for Permitting

Middle Fish Creek Watershed



USGS 7.5' Quadrangle: Glen Easton Watershed: Middle Fish Creek

| Site Locations (NAD 27) | | | | Site Locat | ions (NAD 83) | |
|-------------------------|---------------|----------------|---|--------------------|---------------|---|
| Structure | Latitude (DD) | Longitude (DD) | | Structure | Latitude (DD) | |
| Site Entrance | 39.77683069 | -80.69179853 | | Site Entrance | 39.77690904 | _ |
| Center of Well Pad | 39.77480148 | -80.69220434 | 1 | Center of Well Pad | 39.77487986 | |
| | | | | | | _ |

Scale: 1'' = 1 Mile

Well Location Restrictions

All Pad construction complies with the following restrictions. *250' from an existing well or developed spring used for human or domestic animals.

*625' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy measured from the center of the pad

*1,000' of a surface or ground water intake to a public water supply.

(Well Location Restrictions of WV Code 22-6A-12)

STATE OF

The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection, Office of All Plans, Sheets, and/or Reference Diagrams included in this design constitutes a complete set of plans. A complete set of plans is necessary to construct the site in accordance with the design.

Cover Sheet Schedule of Quantities N1-N4 Site Notes **Pre-Construction Site Conditions** Site Soil Map Clearing Exhibit Overall Plan View E&S Plan View Toe Key Exhibit Plan View Cross Sections - Well Pad Cross Sections - Access Road Geotechnical Exhibit Landowner Disturbed Area Exhibit Site Reclamation M1-M3 **Production Exhibit** D1-D2 **Erosion and Sediment Control Details**

Access Road Details

Pad Details

Description

ell Stern Meade rshall C

Site

PREPARED FOR

TUG HILL

OPERATING

Date: 02/16/2018 Scale: As Shown Designed By: ZS File No. Sheet 1 of 11

Project Contacts

<u>N-1HM</u> WV-N NAD 83 N: 466575.71

WV-N NAD 83 E: 1633444.07

WV-N NAD 27 N: 466538.92

WV-N NAD 27 E: 1664881.02

Lat. NAD 83: 39.77488513

Lon. NAD 83: -80.69212852

Lon. NAD 27: -80.69232036

WV-N NAD 83 N: 466522.29

WV-N NAD 83 E: 1633416.75

WV-N NAD 27 N: 466485.50

WV-N NAD 27 E: 1664853.70

Lat. NAD 83: 39.77473749

Lon. NAD 83: -80.69222317

Lat. NAD 27: 39.77465910

Lon. NAD 27: -80.69241501

WV-N NAD 83 N: 466555.46

WV-N NAD 83 E: 1633457.30

WV-N NAD 27 N: 466518.68

WV-N NAD 27 E: 1664894.25

Lat. NAD 83: 39.77483004

Lon. NAD 83: -80.69208048

Lat. NAD 27: 39.77475165

Lon. NAD 27: -80.69227233

WV-N NAD 83 E: 1633600.53

WV-N NAD 27 N: 467274.12

WV-N NAD 27 E: 1665037.46 Lat. NAD 83: 39.77690904

Lon. NAD 83: -80.69160660

Lat. NAD 27: 39.77683069

Lon. NAD 27: -80.69179853

UTM 17 NAD 83 N: 4403042.26 UTM 17 NAD 83 E: 526409.86

Tug Hill Operating Survey and Engineer Jonathan White - Regulatory Analyst Kenneth Kelly 724-485-2000 Off. 304-689-7676 Cell

304-338-6985 Off. Geoff Radler - V.P. Production John P. See 817-632-5200 Off. 304-442-0220 Off.

TM 17 NAD 83 (m) N: 4402801.06 UTM 17 NAD 83 (m) N: 4402797.78

Tug Hill Operating, LLC Zackary Summerfield 380 Southpointe Blvd 304-338-6987 Off. Southpointe Plaza II, Suite 200 Canonsburg, PA 15317

Geotechnical: Geotechnical investigation as provided by Kleinfelder

dated February 2018 **Environmental:**

dated May 19, 2017 **Topographic Information:** The topographic information shown herein is based on

Wetland Delineations as provided by Allstar Ecology

aerial photography by Blue Mountain Aerial Mapping, Burton, WV MISS UTILITY OF WEST VIRGINIA

1-800-245-4848 West Virginia State Law Section XIV: Chapter 24-C requires that you call two business days Know what's below. ou dig in the state of West Virginia. Call before you dig. IT'S THE LAW

Fug Hill Operating will obtain an Encroachment Permit (Form MM-109) from the WV Department of Transportation, Division of Highways, prior to the commencement of any construction activities

> WVDEP Website files show that there are active and/or abandoned gas wells within the AOI

activities are not within the AOI.

Do site construction activities take place in a floodplain. Permit needed from county floodplain coordinator: Flood Hazard Zone HEC-RAS Study completed:

Floodplain Conditions The WV Mines Website was consulted. Previous (Current) mining

WV-N NAD 27 E: 1664886.48 Lat. NAD 83: 39.77491466 Lon. NAD 83: -80.69210958 Lat. NAD 27: 39.77483628 Lon. NAD 27: -80.69230143 ΓM 17 NAD 83 (m) N: 4402820.76 JTM 17 NAD 83 (m) E: 526367.55 WV-N NAD 83 E: 1633422.22 WV-N NAD 27 N: 466496.19 WV-N NAD 27 E: 1664859.17 Lat. NAD 83: 39.77476702 Lon. NAD 83: -80.69220424 TM 17 NAD 83 (m) N: 4402817.48 UTM 17 NAD 83 (m) N: 4402814.19 UTM 17 NAD 83 (m) N: 4402810.91 UTM 17 NAD 83 (m) N: 4402807.63 UTM 17 NAD 83 (m) N: 4402804.35 UTM 17 NAD 83 (m) E: 526365.94 UTM 17 NAD 83 (m) E: 526364.33 UTM 17 NAD 83 (m) E: 526362.72 UTM 17 NAD 83 (m) E: 526361.11 UTM 17 NAD 83 (m) E: 526359.50 Lat. NAD 83: 39.77485957 Lon. NAD 83: -80.69206155 Lat. NAD 27: 39.77478118

WV-N NAD 83 N: 466576.83 WV-N NAD 83 N: 466566.15 WV-N NAD 83 E: 1633468.23 WV-N NAD 83 E: 1633462.77 WV-N NAD 27 N: 466529.36 WV-N NAD 27 N: 466540.05 WV-N NAD 27 E: 1664905.18 WV-N NAD 27 E: 1664899.72 Lat. NAD 83: 39.77488910 Lon. NAD 83: -80.69204262 Lat. NAD 27: 39.77481071 Lon. NAD 27: -80.69225339 JTM 17 NAD 83 (m) N: 4402814.66

Lon. NAD 27: -80.69223446 UTM 17 NAD 83 (m) N: 4402817.94 UTM 17 NAD 83 (m) E: 526357.89 UTM 17 NAD 83 (m) E: 526356.28 UTM 17 NAD 83 (m) E: 526374.90 UTM 17 NAD 83 (m) E: 526373.29 UTM 17 NAD 83 (m) E: 526371.68 WV-N NAD 83 N: 466523.41 WV-N NAD 83 N: 466512.73 WV-N NAD 83 E: 1633440.91 WV-N NAD 83 E: 1633435.45 WV-N NAD 27 N: 466486.63 WV-N NAD 27 N: 466475.94 WV-N NAD 27 E: 1664877.86 WV-N NAD 27 E: 1664872.40

Lat. NAD 83: 39.77474146 Lat. NAD 83: 39.77471193 Lon. NAD 83: -80.69215620 Lat. NAD 27: 39.77463354

Lon. NAD 83: -80.69213727 Lat. NAD 27: 39.77466307 Lon. NAD 27: -80.69232911 Lon. NAD 27: -80.69234804 TM 17 NAD 83 (m) N: 4402811.38 UTM 17 NAD 83 (m) N: 4402808.09 UTM 17 NAD 83 (m) N: 4402804.81 UTM 17 NAD 83 (m) N: 4402801.53 UTM 17 NAD 83 (m) N: 4402798.25 UTM 17 NAD 83 (m) E: 526365.24 UTM 17 NAD 83 (m) E: 526363.63

WV-N NAD 83 N: 466502.04 WV-N NAD 83 E: 1633429.99 WV-N NAD 27 N: 466465.26 WV-N NAD 27 E: 1664866.94 Lat. NAD 83: 39.77468240 Lon. NAD 83: -80.69217513 Lat. NAD 27: 39.77460401 Lon. NAD 27: -80.69236697 JTM 17 NAD 83 (m) N: 4402794.96

UTM 17 NAD 83 (m) E: 526362.02

<u>N-14HU</u> WV-N NAD 83 N: 466543.66

WV-N NAD 83 E: 1633427.68

WV-N NAD 27 N: 466506.87

WV-N NAD 27 E: 1664864.63

Lat. NAD 83: 39.77479655

Lon. NAD 83: -80.69218531

Lat. NAD 27: 39.77471816

Lon. NAD 27: -80.69237715

WV-N NAD 83 N: 466554.34

WV-N NAD 83 E: 1633433.14 WV-N NAD 27 N: 466517.55

WV-N NAD 27 E: 1664870 09

Lat. NAD 83: 39.77482608

Lon. NAD 83: -80.69216638

Lat. NAD 27: 39.77474769

Lon. NAD 27: -80.69235822

WV-N NAD 83 N: 466587.52

WV-N NAD 83 E: 1633473.69

WV-N NAD 27 N: 466550.73

WV-N NAD 27 E: 1664910.64

Lat. NAD 83: 39.77491863

Lon. NAD 83: -80.69202368

Lat. NAD 27: 39.77484024

Lon, NAD 27: -80.69221554

UTM 17 NAD 83 (m) N: 4402821.23

WV-N NAD 83 N: 466534.10

WV-N NAD 83 E: 1633446.38

WV-N NAD 27 N: 466497.31

WV-N NAD 27 E: 1664883.33

Lat. NAD 83: 39.77477098

Lon. NAD 83: -80.69211834

Lat. NAD 27: 39.77469259

Lon. NAD 27: -80 69231018

UTM 17 NAD 83 (m) E: 526368.46 UTM 17 NAD 83 (m) E: 526366.85

Approach Routes:

From the intersection of OH Rt 7 and WV Rt 2 near New Martinsville, WV. Travel North on WV Rt 2 for 13.8 mi. Turn Right onto Co Rt 74 (Fish Creek Rd). Follow Co Rt 74 for 12.1 mi. Turn Right onto Emr Rt 2 (Continue on Co Rt 74). Follow Emr Rt 2 for 0.2 mi. Turn sharp Left onto Co Rt 74 (Fish Creek Rd). Follow Co Rt 74 for 2.1 mi. The site entrance will be on the Left (southeast) side of the road.

*300' from the edge of disturbance to a naturally reproducing trout stream.

