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west virginia department of environmental protection

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

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

Monday, October 22, 2018  
WELL WORK PERMIT  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for KEITH STERN N-6HM  
47-051-02098-00-00

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

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

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



James A. Martin  
Chief

Operator's Well Number: KEITH STERN N-6HM  
Farm Name: TH EXPLORATION, LLC  
U.S. WELL NUMBER: 47-051-02098-00-00  
Horizontal 6A New Drill  
Date Issued: 10/22/2018

# PERMIT CONDITIONS

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

## CONDITIONS

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

## PERMIT CONDITIONS

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




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Austin Caperton, Cabinet Secretary  
dep.wv.gov

**ORDER  
ISSUED UNDER  
WEST VIRGINIA CODE, CHAPTER 22, ARTICLE 6A**

TO: Tug Hill Operating  
380 Southpointe Boulevard, Plaza II, Suite 200  
Cannonsburg, Pa 15317

DATE: July 25, 2018  
ORDER NO.: 2018-W-4

**INTRODUCTION**

This Order (hereinafter "Order") is issued by the Office of Oil and Gas (hereinafter "OOG"), by and through its Chief, pursuant to the authority of W. Va. Code §§ 22-1-1, 22-6-1 and 22-6A-1 *et seq.* to Tug Hill Operating (hereinafter "Tug Hill" or "Operator"), collectively the "Parties."

**FINDINGS OF THE CHIEF**

In support of this Order, the Chief hereby finds the following:

1. OOG, an office within the West Virginia Department of Environmental Protection, is the agency with the duty and authority to execute and enforce W. Va. Code §22-6-1 and §22-6A-1 *et seq.*, and the rules and regulations promulgated thereunder.
2. Tug Hill is a "person" as defined by W. Va. Code §22-6-1(n), with a corporate address as 380 Southpointe Boulevard, Plaza II, Suite 200, Cannonsburg, Pa 15317
3. On May 5, 2018 Tug Hill submitted a well work permit application identified as API# 47-051-02041. The proposed well is to be located on the Keith Stern Pad in the Meade District of Marshall County, West Virginia.
4. On May 5, 2018 Tug Hill requested a waiver for Perennial Stream S1, Wetland W1 and Wetland W2 outlined in Attachment 1, from well location restriction requirements in W. Va. Code §22-6A-12(b) for the well work permit application identified as API# 47-051-02041.

**CONCLUSIONS OF LAW**

1. West Virginia Code §22-1-6(d) requires, in part, that “in addition to other powers, duties and responsibilities granted and assigned to the secretary by this chapter, the secretary is authorized and empowered to... (3) Enter private lands to make surveys and inspections for environmental protection purposes; to investigate for violations of statutes or rules which the Office of Oil and Gas is charged with enforcing; to serve and execute warrants and processes; to make arrests; issue orders, which for the purposes of this chapter include consent agreements; and to otherwise enforce the statutes or rules which the Office of Oil and Gas is charged with enforcing.”
2. West Virginia Code §22-6A-2(a)(6) requires, in part, that “Concomitant with the broad powers to condition the issuance of well work permits, the secretary should also have broad authority to waive certain minimum requirements of this article when, in his or her discretion, such waiver is appropriate: *Provided*, That the secretary shall submit a written report of the number of waivers granted to the Legislature commencing January 1, 2013, and each year thereafter.”
3. West Virginia Code §22-6A-12(b) requires, in part, that “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 Office of Oil and Gas 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 Office of Oil and Gas 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.”

**ORDER**


West Virginia Code §22-6A-12(b) requires, in part, that “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. The Office of Oil and Gas grants the request for a waiver for Perennial Stream S1, Wetland W1 and Wetland W2 from well location restriction requirements in W. Va. Code §22-6A-12(b) for the well work permit application identified as API# 47-051-02041. The Office of Oil and Gas hereby **ORDERS** that Tug Hill shall meet the following site construction and operational requirements for the Keith Stern Well Pad:

- a. A berm shall be constructed around the perimeter of the pad to contain any potential spills and storm water runoff. Berm is to be at least twenty-four inches (24”) in height;
- b. Erosion control blankets shall be installed on all slopes and down gradient locations of the pad as erosion and sediment controlling BMPs;
- c. Stream 1 shall be protected by twenty-four-inch (24”) compost filter sock and super silt fence. SedCatch inlet protection for existing culverts shall also be provided. This along with temporary and permanent vegetative cover will prevent sediment from reaching the stream.
- d. Wetlands W1 and W2 shall be protected by twenty-four-inch (24”) compost filter sock and super silt fence. This along with temporary and permanent vegetative cover will prevent sediment from reaching the wetlands
- e. Disturbed areas not used for operations shall be seeded and mulched per the seeding tables in the WVDEP-OOG Erosion and Sediment Control Manual;
- f. Drill cuttings and associated drilling mud shall be disposed of in a permitted landfill;
- g. Waste generated by the flowback treatment systems shall be sent to offsite disposal at a permitted landfill;
- h. Weekly site inspections shall be conducted to monitor and maintain the integrity of the BMP storm water controls;
- i. Weekly storm water and spill prevention inspections shall be conducted focusing on storm water and spill prevention BMPs and maintenance of these BMPs;
- j. Inspections of the storm water and spill prevention measures shall be conducted after any major storm event defined as a half inch (½”) rain within any twenty-four (24) hour period;
- k. Pad inspections shall be conducted no less than once a week to identify and mitigate potential deficiencies;
- l. All records from inspections shall be maintained on site for the life of the project and be available upon request.

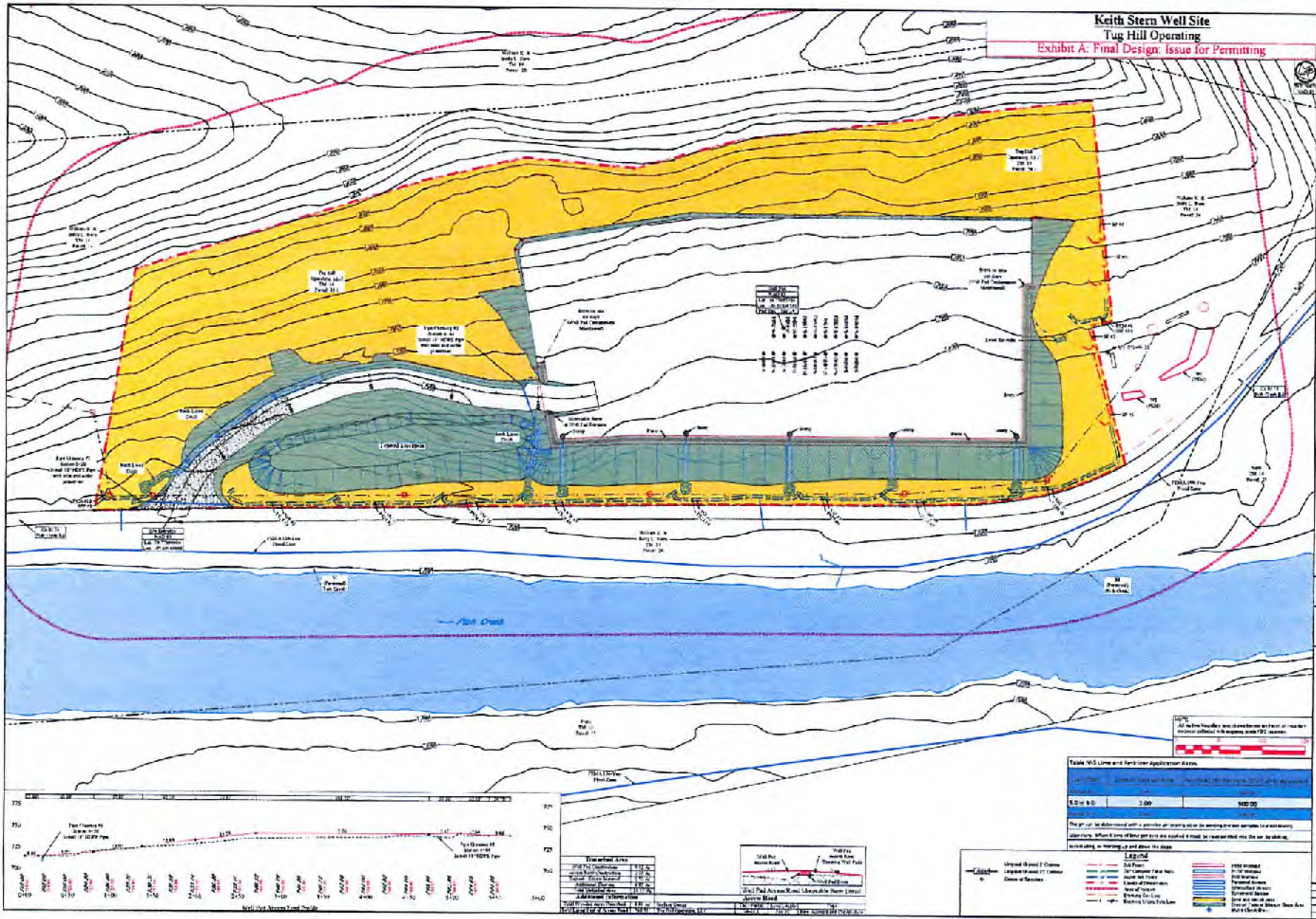
Thus ORDERED, the 25th day of July, 2018.

IN THE NAME OF THE STATE OF WEST VIRGINIA:

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

By:   
\_\_\_\_\_  
JAMES A. MARTIN, CHIEF

**Keith Stern Well Site**  
**Tug Hill Operating**  
**Exhibit A: Final Design: Issue for Permitting**



**TUG HILL OPERATING**  
 THIS DOCUMENT PREPARED FOR TUG HILL OPERATING  
**Keith Stern Well Site**  
 Meigs District  
 Marshall County, WV  
 Date: 10/17/2019  
 Scale: 1" = 200'  
 Title: Keith Stern Well Site

4705102098



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

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

2) Operator's Well Number: Keith Stern N-6HM Well Pad Name: Keith Stern

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

4) Elevation, current ground: 741.50' Elevation, proposed post-construction: 744.65'

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

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus is the target formation at a depth of 6262' - 6313', thickness of 51' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6413'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 13,621'

11) Proposed Horizontal Leg Length: 6,040.17'

12) Approximate Fresh Water Strata Depths: 70'; 460'

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

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 369' and Pittsburgh Coal - 454'

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

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

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

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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 <sup>3</sup> (CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	560'	560'	739ft <sup>3</sup> (CTS)
Coal	13 3/8"	NEW	J55	54.5#	560'	560'	739ft <sup>3</sup> (CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,220'	2,200'	727ft <sup>3</sup> (CTS)
Production	5 1/2"	NEW	P110	20#	13,621'	13,621'	3492ft <sup>3</sup> (CTS)
Tubing	2 3/8"	NEW	N80	4.7#	7,278'		
Liners							

*JS*  
*8/1/18*

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

PACKERS

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

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WW-6B  
(10/14)

API NO. 47-051 - 02098  
OPERATOR WELL NO. Keith Stern N-6HM  
Well Pad Name: Keith Stern

*JS*  
*8/1/18*

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

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

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

Well to completed with approximately 15,097,500 lb. proppant and 233,418 barrels of water.  
Max rate = 80bpm; max psi = 9,000#.

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

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

23) Describe centralizer placement for each casing string:

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

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

\*See attachment

25) Proposed borehole conditioning procedures:

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

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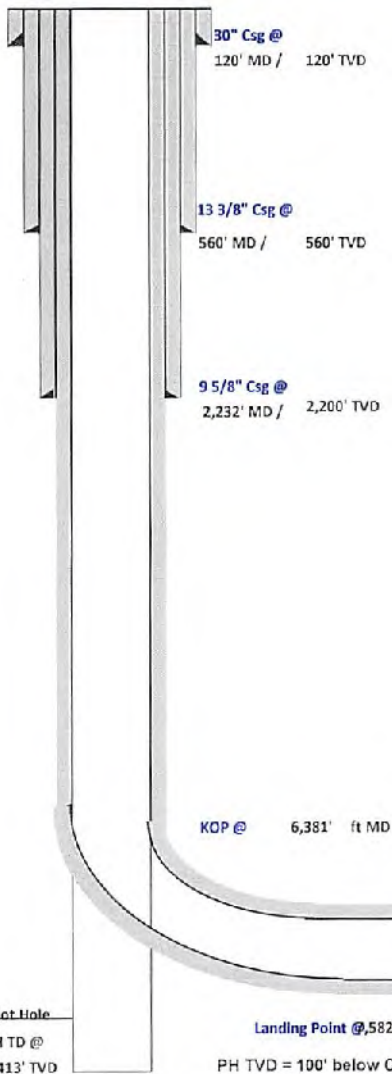
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\*Note: Attach additional sheets as needed.



WELL NAME: Keith Stern N-6HM  
 STATE: WV COUNTY: Marshall  
 DISTRICT: Meade  
 DF Elev: 744' GL Elev: 744'  
 TD: 13,621'  
 TH Latitude: 39.7748891  
 TH Longitude: -80.69204262  
 BH Latitude: 39.78881432  
 BH Longitude: -80.69353361



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	460
Sewickley Coal	369
Pittsburgh Coal	454
Big Lime	1611
Weir	1924
Berea	2116
Gordon	2381
Rhinestreet	5592
Genesee/Burkett	6106
Tully	6137
Hamilton	6172
Marcellus	6262
Landing Depth	6302
Onondaga	6313
Pilot Hole Depth	6413

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	560'	560'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,232'	2,200'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	13,621'	6,197'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.5	Air	None
Surface	721	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	735	A	15	Air	1 Centralizer every other jt
Production	3,086	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

*Handwritten signature and date: 8/1/18*

Pilot Hole  
 PH TD @  
 6,413' TVD

Landing Point @ 5,582' MD / 6,302' TVD  
 PH TVD = 100' below Onondaga Top

Lateral TD @ 13,621' ft MD  
 6,197' ft TVD

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**Tug Hill Operating, LLC Casing and Cement Program**

**Keith Stern N-6HM**

**Casing**

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	560'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,232'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	13,621'	CTS

**Cement**

- Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2
- Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2
- Intermediate: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19
- Kick Off Plug: Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug
- Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

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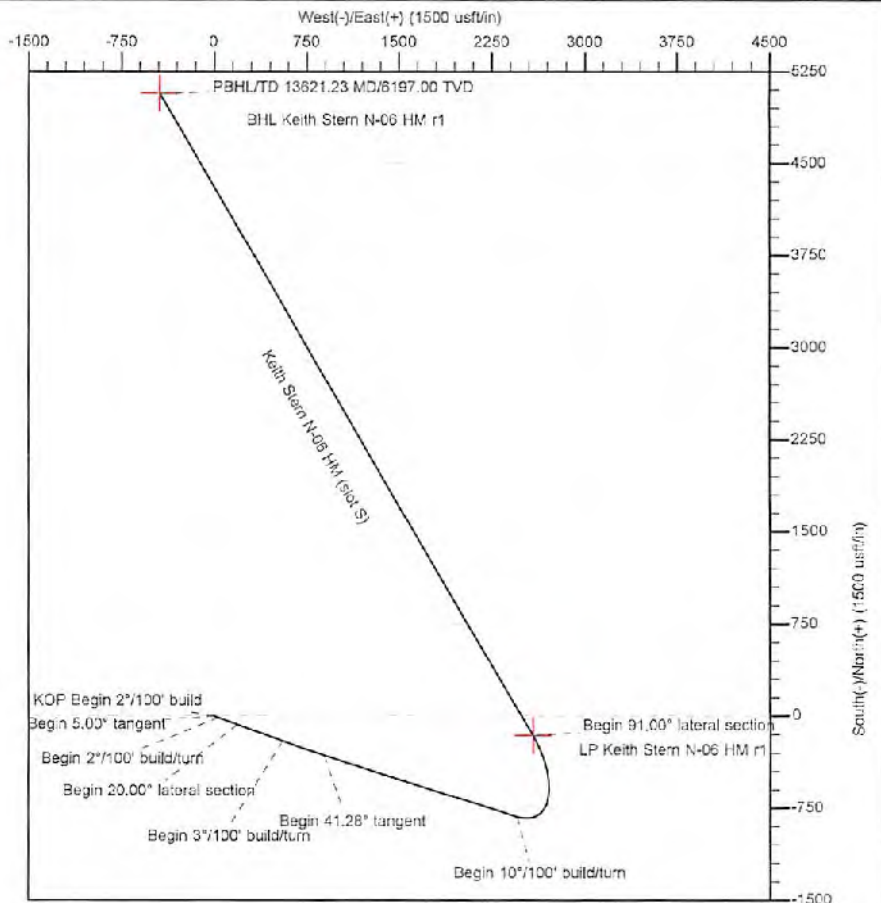
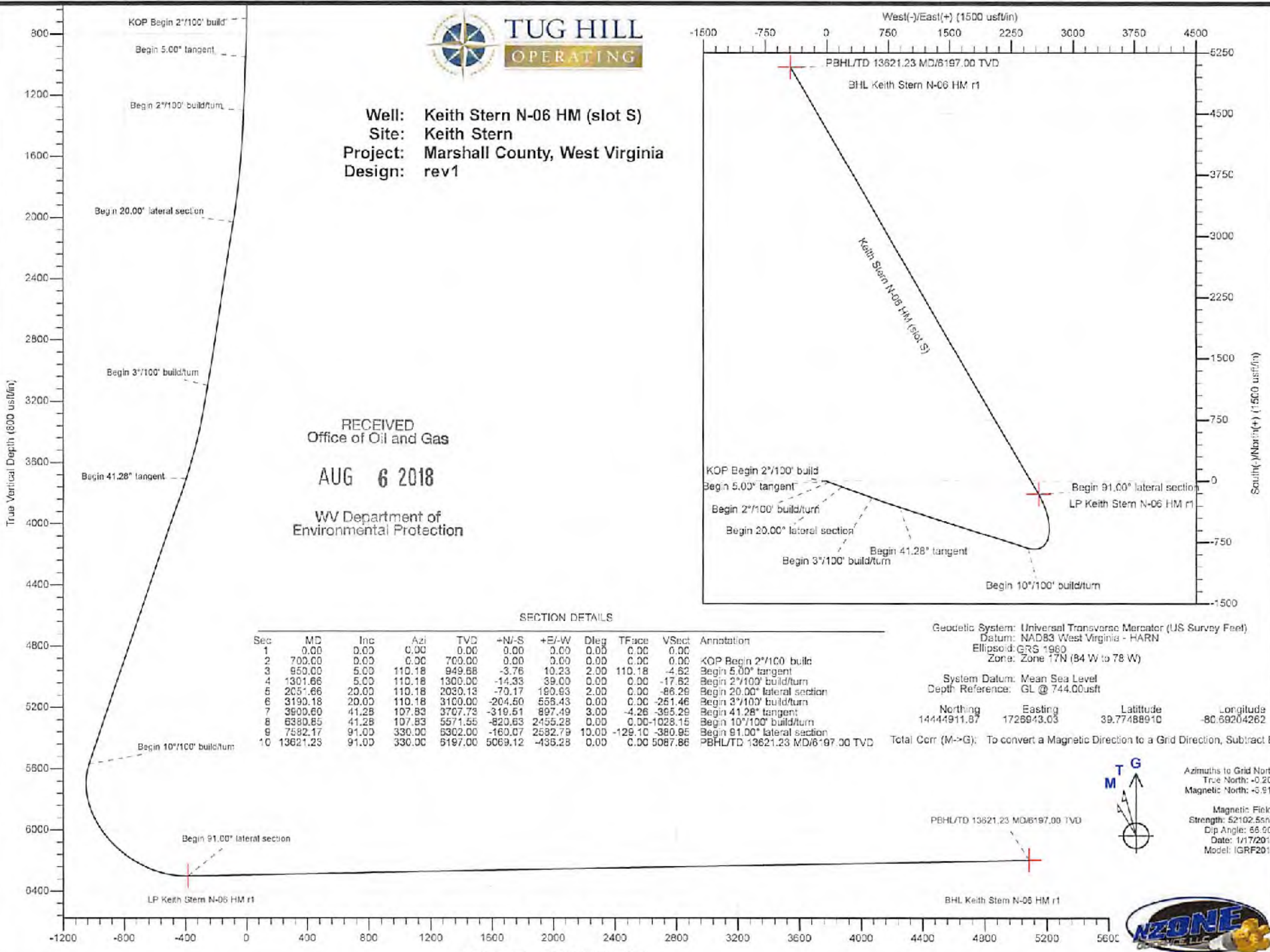
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Well: Keith Stern N-06 HM (slot S)  
 Site: Keith Stern  
 Project: Marshall County, West Virginia  
 Design: rev1

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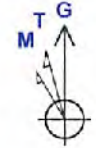
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	650.00	5.00	110.18	949.68	-3.76	10.23	2.00	110.18	-4.62	Begin 5.00° tangent
4	1301.66	5.00	110.18	1300.00	-14.33	39.00	0.00	0.00	-17.62	Begin 2°/100' build/turn
5	2051.66	20.00	110.18	2030.13	-70.17	190.93	2.00	0.00	-86.29	Begin 20.00° lateral section
6	3190.18	20.00	110.18	3100.00	-204.50	558.43	0.00	0.00	-261.46	Begin 3°/100' build/turn
7	3900.60	41.28	107.83	3707.73	-319.51	897.49	3.00	-4.26	-365.29	Begin 41.28° tangent
8	6380.85	41.28	107.83	5571.55	-820.63	2455.28	0.00	0.00	-1028.15	Begin 10°/100' build/turn
9	7582.17	91.00	330.00	5302.00	-160.07	2582.79	10.00	-129.10	-380.95	Begin 91.00° lateral section
10	13621.23	91.00	330.00	5197.00	5069.12	-435.28	0.00	0.00	5087.86	PBH/TD 13621.23 MD/6197.00 TVD

Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD83 West Virginia - HARN  
 Ellipsoid: GRS 1960  
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level  
 Depth Reference: GL @ 744.00usf  
 Northing: 14444911.87 Easting: 1726943.03 Latitude: 39.77488910 Longitude: -80.89204262

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



Azimuths to Grid North  
 True North: -0.20°  
 Magnetic North: -8.91°  
 Magnetic Field  
 Strength: 52102.5nT  
 Dip Angle: 55.90°  
 Date: 1/17/2018  
 Model: IGRF2015





Planning Report - Geographic

<b>Database:</b>	DB_Jul2218dt_v14	<b>Local Co-ordinate Reference:</b>	Well Keith Stern N-06 HM (slot S)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 744.00usft
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	GL @ 744.00usft
<b>Site:</b>	Keith Stern	<b>North Reference:</b>	Grid
<b>Well:</b>	Keith Stern N-06 HM (slot S)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

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

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

<b>Well</b>	Keith Stern N-06 HM (slot S)					
<b>Well Position</b>	<b>+N-S</b>	0.00 usft	<b>Northing:</b>	14,444,911.87 usft	<b>Latitude:</b>	39.77488910
	<b>+E-W</b>	0.00 usft	<b>Easting:</b>	1,726,943.03 usft	<b>Longitude:</b>	-80.69204262
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	744.00 usft

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	1/17/2018	-8.71	66.90	52,102.53329037

<b>Design</b>	rev1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	355.06

<b>Plan Survey Tool Program</b>	<b>Date</b>	7/6/2018		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	13,621.23 rev1 (Original Hole)	MWD	
			MWD - Standard	

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Keith Stern N-06 HM (slot S)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 744.00usft
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	GL @ 744.00usft
<b>Site:</b>	Keith Stern	<b>North Reference:</b>	Grid
<b>Well:</b>	Keith Stern N-06 HM (slot S)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Plan Sections											
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00		
950.00	5.00	110.18	949.68	-3.76	10.23	2.00	2.00	0.00	110.18		
1,301.66	5.00	110.18	1,300.00	-14.33	39.00	0.00	0.00	0.00	0.00		
2,051.66	20.00	110.18	2,030.13	-70.17	190.93	2.00	2.00	0.00	0.00		
3,190.18	20.00	110.18	3,100.00	-204.50	556.43	0.00	0.00	0.00	0.00		
3,900.60	41.28	107.83	3,707.73	-319.51	897.49	3.00	3.00	-0.33	-4.26		
6,380.85	41.28	107.83	5,571.55	-820.63	2,455.28	0.00	0.00	0.00	0.00		
7,582.17	91.00	330.00	6,302.00	-160.07	2,562.79	10.00	4.14	-11.47	-129.10	LP Keith Stern N-06 F	
13,621.23	91.00	330.00	6,197.00	5,069.12	-436.28	0.00	0.00	0.00	0.00	BHL Keith Stern N-06	

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Planning Report - Geographic

Database: DB\_Jul2218dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia  
 Site: Keith Stern  
 Well: Keith Stern N-06 HM (slot S)  
 Wellbore: Original Hole  
 Design: rev1

Local Co-ordinate Reference: Well Keith Stern N-06 HM (slot S)  
 TVD Reference: GL @ 744.00usft  
 MD Reference: GL @ 744.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
100.00	0.00	0.00	100.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
200.00	0.00	0.00	200.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
300.00	0.00	0.00	300.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
400.00	0.00	0.00	400.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
500.00	0.00	0.00	500.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
600.00	0.00	0.00	600.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
700.00	0.00	0.00	700.00	0.00	0.00	14,444,911.87	1,726,943.03	39.77488910	-80.69204262
<b>KOP Begin 2°/100' build</b>									
800.00	2.00	110.18	799.98	-0.60	1.64	14,444,911.27	1,726,944.67	39.77488743	-80.69203690
900.00	4.00	110.18	899.84	-2.41	6.55	14,444,909.48	1,726,949.58	39.77488243	-80.69201934
950.00	5.00	110.18	949.68	-3.76	10.23	14,444,908.11	1,726,953.27	39.77487866	-80.69200625
<b>Begin 5.00° tangent</b>									
1,000.00	5.00	110.18	999.49	-5.26	14.32	14,444,906.60	1,726,957.36	39.77487451	-80.69199171
1,100.00	5.00	110.18	1,099.11	-8.27	22.50	14,444,903.60	1,726,965.54	39.77486818	-80.69196263
1,200.00	5.00	110.18	1,198.73	-11.28	30.68	14,444,900.59	1,726,973.72	39.77485784	-80.69193355
1,300.00	5.00	110.18	1,298.35	-14.28	38.86	14,444,897.58	1,726,981.90	39.77484951	-80.69190448
1,301.86	5.00	110.18	1,300.00	-14.33	39.00	14,444,897.53	1,726,982.03	39.77484937	-80.69190399
<b>Begin 2°/100' build/turn</b>									
1,400.00	6.97	110.18	1,397.80	-17.87	48.62	14,444,894.00	1,726,991.65	39.77483957	-80.69186979
1,500.00	8.97	110.18	1,496.83	-22.65	61.63	14,444,889.22	1,727,004.66	39.77482831	-80.69182355
1,600.00	10.97	110.18	1,595.32	-28.62	77.87	14,444,883.25	1,727,020.91	39.77480976	-80.69176591
1,700.00	12.97	110.18	1,693.14	-35.77	97.34	14,444,876.09	1,727,040.37	39.77478994	-80.69169664
1,800.00	14.97	110.18	1,790.18	-44.10	119.99	14,444,867.77	1,727,063.02	39.77476688	-80.69161611
1,900.00	16.97	110.18	1,888.32	-53.59	145.81	14,444,858.28	1,727,088.84	39.77474055	-80.69152434
2,000.00	18.97	110.18	1,981.44	-64.23	174.76	14,444,847.64	1,727,117.79	39.77471106	-80.69142143
2,051.86	20.00	110.18	2,030.13	-70.17	190.93	14,444,841.70	1,727,133.96	39.77469458	-80.69136395
<b>Begin 20.00° lateral section</b>									
2,100.00	20.00	110.18	2,075.56	-75.88	206.45	14,444,835.99	1,727,149.48	39.77467877	-80.69130878
2,200.00	20.00	110.18	2,169.53	-87.66	238.55	14,444,824.19	1,727,181.59	39.77464607	-80.69119467
2,300.00	20.00	110.18	2,263.50	-99.47	270.65	14,444,812.39	1,727,213.69	39.77461338	-80.69108056
2,400.00	20.00	110.18	2,357.47	-111.27	302.76	14,444,800.60	1,727,245.79	39.77458065	-80.69096645
2,500.00	20.00	110.18	2,451.44	-123.07	334.86	14,444,788.80	1,727,277.89	39.77454795	-80.69085235
2,600.00	20.00	110.18	2,545.41	-134.87	366.96	14,444,777.00	1,727,310.00	39.77451524	-80.69073824
2,700.00	20.00	110.18	2,639.38	-146.67	399.06	14,444,765.20	1,727,342.10	39.77448253	-80.69062413
2,800.00	20.00	110.18	2,733.35	-158.47	431.17	14,444,753.40	1,727,374.20	39.77444983	-80.69051002
2,900.00	20.00	110.18	2,827.32	-170.27	463.27	14,444,741.60	1,727,406.30	39.77441712	-80.69039591
3,000.00	20.00	110.18	2,921.29	-182.07	495.37	14,444,729.80	1,727,438.41	39.77438441	-80.69028180
3,100.00	20.00	110.18	3,015.25	-193.86	527.47	14,444,718.00	1,727,470.51	39.77435171	-80.69016769
3,190.18	20.00	110.18	3,100.00	-204.50	556.43	14,444,707.36	1,727,499.46	39.77432221	-80.69006478
<b>Begin 3°/100' build/turn</b>									
3,200.00	20.29	110.12	3,109.22	-205.67	559.60	14,444,706.20	1,727,502.63	39.77431898	-80.69005350
3,300.00	23.29	109.58	3,202.06	-218.25	594.52	14,444,693.61	1,727,537.55	39.77428409	-80.68992938
3,400.00	26.28	109.13	3,292.84	-232.13	634.07	14,444,679.74	1,727,577.10	39.77424561	-80.68978879
3,500.00	29.28	108.77	3,381.30	-247.25	678.15	14,444,664.61	1,727,621.18	39.77420365	-80.68963210
3,600.00	32.27	108.48	3,467.21	-263.59	726.63	14,444,648.28	1,727,669.66	39.77415933	-80.68945975
3,700.00	35.27	108.23	3,550.33	-281.09	779.38	14,444,630.78	1,727,722.42	39.77410976	-80.68927222
3,800.00	38.27	108.02	3,630.43	-299.71	836.26	14,444,612.16	1,727,779.30	39.77405809	-80.68907000
3,900.00	41.26	107.83	3,707.29	-319.39	897.12	14,444,592.48	1,727,840.15	39.77400346	-80.68885367
3,900.60	41.28	107.83	3,707.74	-319.51	897.50	14,444,592.36	1,727,840.53	39.77400312	-80.68885233
<b>Begin 41.28° tangent</b>									
4,000.00	41.28	107.83	3,782.43	-339.59	959.93	14,444,572.27	1,727,902.96	39.77394737	-80.68863038
4,100.00	41.28	107.83	3,857.59	-359.80	1,022.73	14,444,552.07	1,727,965.77	39.77389128	-80.68840710
4,200.00	41.28	107.83	3,932.72	-380.00	1,085.54	14,444,531.88	1,728,028.57	39.77383520	-80.68818382



Planning Report - Geographic

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
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 Site: Keith Stern  
 Well: Keith Stern N-06 HM (slot S)  
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 Design: rev1

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Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,300.00	41.28	107.83	4,007.87	-400.21	1,148.35	14,444,511.66	1,728,091.38	39.77377911	-80.68795053	
4,400.00	41.28	107.83	4,083.02	-420.41	1,211.16	14,444,491.46	1,728,154.19	39.77372302	-80.68773725	
4,500.00	41.28	107.83	4,158.16	-440.62	1,273.96	14,444,471.25	1,728,217.00	39.77366693	-80.68751397	
4,600.00	41.28	107.83	4,233.31	-460.82	1,336.77	14,444,451.05	1,728,279.80	39.77361085	-80.68729069	
4,700.00	41.28	107.83	4,308.46	-481.03	1,399.58	14,444,430.84	1,728,342.61	39.77355476	-80.68706741	
4,800.00	41.28	107.83	4,383.60	-501.23	1,462.39	14,444,410.64	1,728,405.42	39.77349867	-80.68684413	
4,900.00	41.28	107.83	4,458.75	-521.43	1,525.19	14,444,390.43	1,728,468.23	39.77344258	-80.68662065	
5,000.00	41.28	107.83	4,533.90	-541.64	1,588.00	14,444,370.23	1,728,531.03	39.77338649	-80.68639757	
5,100.00	41.28	107.83	4,609.04	-561.84	1,650.81	14,444,350.02	1,728,593.84	39.77333039	-80.68617429	
5,200.00	41.28	107.83	4,684.19	-582.05	1,713.62	14,444,329.82	1,728,656.65	39.77327430	-80.68595101	
5,300.00	41.28	107.83	4,759.34	-602.25	1,776.42	14,444,309.62	1,728,719.46	39.77321821	-80.68572773	
5,400.00	41.28	107.83	4,834.48	-622.46	1,839.23	14,444,289.41	1,728,782.26	39.77316212	-80.68550446	
5,500.00	41.28	107.83	4,909.63	-642.66	1,902.04	14,444,269.21	1,728,845.07	39.77310603	-80.68528118	
5,600.00	41.28	107.83	4,984.78	-662.87	1,964.85	14,444,249.00	1,728,907.88	39.77304993	-80.68505790	
5,700.00	41.28	107.83	5,059.92	-683.07	2,027.65	14,444,228.80	1,728,970.69	39.77299384	-80.68483462	
5,800.00	41.28	107.83	5,135.07	-703.27	2,090.46	14,444,208.59	1,729,033.49	39.77293775	-80.68461135	
5,900.00	41.28	107.83	5,210.22	-723.48	2,153.27	14,444,188.39	1,729,096.30	39.77288165	-80.68438807	
6,000.00	41.28	107.83	5,285.36	-743.68	2,216.08	14,444,168.16	1,729,159.11	39.77282556	-80.68416480	
6,100.00	41.28	107.83	5,360.51	-763.89	2,278.88	14,444,147.98	1,729,221.92	39.77276946	-80.68394152	
6,200.00	41.26	107.83	5,435.65	-784.09	2,341.69	14,444,127.78	1,729,284.72	39.77271337	-80.68371824	
6,300.00	41.28	107.83	5,510.80	-804.30	2,404.50	14,444,107.57	1,729,347.53	39.77265727	-80.68349497	
6,380.65	41.28	107.83	5,571.56	-820.63	2,455.28	14,444,091.24	1,729,398.31	39.77261192	-80.68331445	
<b>Begin 10°/100' build/turn</b>										
6,400.00	40.10	105.52	5,586.08	-824.22	2,467.24	14,444,087.65	1,729,410.27	39.77260195	-80.68327194	
6,500.00	34.80	91.53	5,665.58	-833.82	2,526.94	14,444,078.25	1,729,469.97	39.77257555	-80.68305958	
6,600.00	31.52	74.19	5,749.48	-827.24	2,580.75	14,444,084.63	1,729,523.78	39.77259255	-80.68286799	
6,700.00	30.93	54.86	5,835.21	-805.27	2,627.03	14,444,106.60	1,729,570.07	39.77265243	-80.68270300	
6,800.00	33.16	36.42	5,920.18	-768.38	2,664.36	14,444,143.49	1,729,607.41	39.77275338	-80.68256992	
6,900.00	37.72	21.01	6,001.79	-717.69	2,691.66	14,444,194.18	1,729,634.69	39.77289232	-80.68247190	
7,000.00	43.87	8.91	6,077.58	-654.74	2,708.03	14,444,257.13	1,729,651.07	39.77306504	-80.68241282	
7,100.00	51.04	359.41	6,145.23	-581.44	2,713.01	14,444,330.43	1,729,655.05	39.77326629	-80.68239416	
7,200.00	58.83	351.73	6,202.70	-500.02	2,706.45	14,444,411.85	1,729,649.48	39.77348995	-80.68241650	
7,300.00	67.00	345.25	6,248.24	-412.96	2,688.53	14,444,498.91	1,729,631.57	39.77372923	-80.68247916	
7,400.00	75.41	339.52	6,280.45	-322.89	2,659.82	14,444,588.98	1,729,602.85	39.77397686	-80.68258023	
7,500.00	83.94	334.22	6,298.37	-232.56	2,621.17	14,444,679.31	1,729,564.20	39.77422531	-80.68271665	
7,582.17	91.00	330.00	6,302.00	-160.07	2,582.79	14,444,751.80	1,729,525.83	39.77442475	-80.68285230	
<b>Begin 91.00° lateral section</b>										
7,600.00	91.00	330.00	6,301.69	-144.63	2,573.88	14,444,767.24	1,729,516.91	39.77446724	-80.68288393	
7,700.00	91.00	330.00	6,299.95	-58.04	2,523.89	14,444,853.83	1,729,466.92	39.77470552	-80.68306067	
7,800.00	91.00	330.00	6,298.21	28.55	2,473.90	14,444,940.42	1,729,416.93	39.77494381	-80.68323750	
7,900.00	91.00	330.00	6,296.47	115.14	2,423.90	14,445,027.01	1,729,366.94	39.77518209	-80.68341434	
8,000.00	91.00	330.00	6,294.74	201.73	2,373.91	14,445,113.60	1,729,316.94	39.77542037	-80.68359118	
8,100.00	91.00	330.00	6,293.00	288.32	2,323.92	14,445,200.18	1,729,266.95	39.77565855	-80.68376802	
8,200.00	91.00	330.00	6,291.26	374.91	2,273.93	14,445,286.77	1,729,216.96	39.77589693	-80.68394486	
8,300.00	91.00	330.00	6,289.52	461.50	2,223.93	14,445,373.36	1,729,166.97	39.77613522	-80.68412170	
8,400.00	91.00	330.00	6,287.78	548.08	2,173.94	14,445,459.95	1,729,116.97	39.77637350	-80.68429854	
8,500.00	91.00	330.00	6,286.04	634.67	2,123.95	14,445,546.54	1,729,066.98	39.77661178	-80.68447539	
8,600.00	91.00	330.00	6,284.30	721.26	2,073.96	14,445,633.13	1,729,016.99	39.77685006	-80.68465223	
8,700.00	91.00	330.00	6,282.56	807.85	2,023.96	14,445,719.72	1,728,967.00	39.77708834	-80.68482908	
8,800.00	91.00	330.00	6,280.83	894.44	1,973.97	14,445,806.31	1,728,917.01	39.77732662	-80.68500593	
8,900.00	91.00	330.00	6,279.09	981.03	1,923.98	14,445,892.90	1,728,867.01	39.77756490	-80.68518278	
9,000.00	91.00	330.00	6,277.35	1,067.62	1,873.99	14,445,979.49	1,728,817.02	39.77780318	-80.68535963	
9,100.00	91.00	330.00	6,275.61	1,154.21	1,823.99	14,446,066.08	1,728,767.03	39.77804146	-80.68553648	
9,200.00	91.00	330.00	6,273.87	1,240.80	1,774.00	14,446,152.67	1,728,717.04	39.77827974	-80.68571333	



Planning Report - Geographic

<b>Database:</b>	DB_Jul2218dt_v14	<b>Local Co-ordinate Reference:</b>	Well Keith Stern N-06 HM (slot S)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 744.00usft
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	GL @ 744.00usft
<b>Site:</b>	Keith Stern	<b>North Reference:</b>	Grid
<b>Well:</b>	Keith Stern N-06 HM (slot S)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,300.00	91.00	330.00	6,272.13	1,327.39	1,724.01	14,446,239.26	1,728,667.04	39.77851801	-80.68589019	
9,400.00	91.00	330.00	6,270.39	1,413.98	1,674.02	14,446,325.85	1,728,617.05	39.77875629	-80.68606704	
9,500.00	91.00	330.00	6,268.66	1,500.57	1,624.02	14,446,412.44	1,728,567.06	39.77899457	-80.68624390	
9,600.00	91.00	330.00	6,266.92	1,587.16	1,574.03	14,446,499.03	1,728,517.07	39.77923285	-80.68642075	
9,700.00	91.00	330.00	6,265.18	1,673.75	1,524.04	14,446,585.62	1,728,467.07	39.77947113	-80.68659761	
9,800.00	91.00	330.00	6,263.44	1,760.34	1,474.05	14,446,672.21	1,728,417.08	39.77970940	-80.68677447	
9,900.00	91.00	330.00	6,261.70	1,846.93	1,424.06	14,446,758.80	1,728,367.09	39.77994768	-80.68695133	
10,000.00	91.00	330.00	6,259.96	1,933.52	1,374.06	14,446,845.38	1,728,317.10	39.78018596	-80.68712820	
10,100.00	91.00	330.00	6,258.22	2,020.11	1,324.07	14,446,931.97	1,728,267.10	39.78042423	-80.68730506	
10,200.00	91.00	330.00	6,256.48	2,106.70	1,274.08	14,447,018.56	1,728,217.11	39.78066251	-80.68748193	
10,300.00	91.00	330.00	6,254.75	2,193.28	1,224.09	14,447,105.15	1,728,167.12	39.78090079	-80.68765879	
10,400.00	91.00	330.00	6,253.01	2,279.87	1,174.09	14,447,191.74	1,728,117.13	39.78113906	-80.68783566	
10,500.00	91.00	330.00	6,251.27	2,365.46	1,124.10	14,447,278.33	1,728,067.13	39.78137734	-80.68801253	
10,600.00	91.00	330.00	6,249.53	2,453.05	1,074.11	14,447,364.92	1,728,017.14	39.78161561	-80.68818940	
10,700.00	91.00	330.00	6,247.79	2,539.64	1,024.12	14,447,451.51	1,727,967.15	39.78185389	-80.68836627	
10,800.00	91.00	330.00	6,246.05	2,626.23	974.12	14,447,538.10	1,727,917.16	39.78209216	-80.68854314	
10,900.00	91.00	330.00	6,244.31	2,712.82	924.13	14,447,624.69	1,727,867.16	39.78233044	-80.68872001	
11,000.00	91.00	330.00	6,242.58	2,799.41	874.14	14,447,711.28	1,727,817.17	39.78256871	-80.68899699	
11,100.00	91.00	330.00	6,240.84	2,886.00	824.15	14,447,797.87	1,727,767.18	39.78280698	-80.68927376	
11,200.00	91.00	330.00	6,239.10	2,972.59	774.15	14,447,884.46	1,727,717.19	39.78304526	-80.68955064	
11,300.00	91.00	330.00	6,237.36	3,059.18	724.16	14,447,971.05	1,727,667.19	39.78328353	-80.68982752	
11,400.00	91.00	330.00	6,235.62	3,145.77	674.17	14,448,057.64	1,727,617.20	39.78352180	-80.68995040	
11,500.00	91.00	330.00	6,233.88	3,232.36	624.18	14,448,144.23	1,727,567.21	39.78376008	-80.689978128	
11,600.00	91.00	330.00	6,232.14	3,318.95	574.18	14,448,230.82	1,727,517.22	39.78399835	-80.68995816	
11,700.00	91.00	330.00	6,230.40	3,405.54	524.19	14,448,317.41	1,727,467.23	39.78423662	-80.69013504	
11,800.00	91.00	330.00	6,228.67	3,492.13	474.20	14,448,404.00	1,727,417.23	39.78447489	-80.6901193	
11,900.00	91.00	330.00	6,226.93	3,578.72	424.21	14,448,490.58	1,727,367.24	39.78471316	-80.69048881	
12,000.00	91.00	330.00	6,225.19	3,665.31	374.21	14,448,577.17	1,727,317.25	39.78495143	-80.69066570	
12,100.00	91.00	330.00	6,223.45	3,751.90	324.22	14,448,663.76	1,727,267.26	39.78518971	-80.69084259	
12,200.00	91.00	330.00	6,221.71	3,838.48	274.23	14,448,750.35	1,727,217.26	39.78542798	-80.69101948	
12,300.00	91.00	330.00	6,219.97	3,925.07	224.24	14,448,836.94	1,727,167.27	39.78566625	-80.69119637	
12,400.00	91.00	330.00	6,218.23	4,011.66	174.25	14,448,923.53	1,727,117.28	39.78590452	-80.69137326	
12,500.00	91.00	330.00	6,216.49	4,098.25	124.25	14,449,010.12	1,727,067.29	39.78614279	-80.69155015	
12,600.00	91.00	330.00	6,214.76	4,184.84	74.26	14,449,096.71	1,727,017.29	39.78638106	-80.69172705	
12,700.00	91.00	330.00	6,213.02	4,271.43	24.27	14,449,183.30	1,726,967.30	39.78661933	-80.69190394	
12,800.00	91.00	330.00	6,211.28	4,358.02	-25.72	14,449,269.89	1,726,917.31	39.78685760	-80.69208084	
12,900.00	91.00	330.00	6,209.54	4,444.61	-75.72	14,449,356.48	1,726,867.32	39.78709588	-80.69225774	
13,000.00	91.00	330.00	6,207.80	4,531.20	-125.71	14,449,443.07	1,726,817.32	39.78733413	-80.69243464	
13,100.00	91.00	330.00	6,206.06	4,617.79	-175.70	14,449,529.66	1,726,767.33	39.78757240	-80.69261154	
13,200.00	91.00	330.00	6,204.32	4,704.38	-225.69	14,449,616.25	1,726,717.34	39.78781067	-80.69278844	
13,300.00	91.00	330.00	6,202.59	4,790.97	-275.69	14,449,702.84	1,726,667.35	39.78804894	-80.69296534	
13,400.00	91.00	330.00	6,200.85	4,877.56	-325.68	14,449,789.43	1,726,617.35	39.78828720	-80.69314224	
13,500.00	91.00	330.00	6,199.11	4,964.15	-375.67	14,449,876.02	1,726,567.36	39.78852547	-80.69331915	
13,600.00	91.00	330.00	6,197.37	5,050.74	-425.66	14,449,962.61	1,726,517.37	39.78876374	-80.69349606	
13,621.23	91.00	330.00	6,197.00	5,069.12	-436.28	14,449,980.99	1,726,506.76	39.78881432	-80.69353361	

PBHL/TD 13621.23 MD/6197.00 TVD

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Keith Stern N-06 HM (slot S)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 744.00usft
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	GL @ 744.00usft
<b>Site:</b>	Keith Stern	<b>North Reference:</b>	Grid
<b>Well:</b>	Keith Stern N-06 HM (slot S)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
BHL Keith Stern N-06 HI - plan hits target center - Point	0.00	0.00	6,197.00	5,069.12	-436.28	14,449,980.99	1,726,506.75	39.78861433	-80.69353362
LP Keith Stern N-06 HM - plan hits target center - Point	0.00	0.01	6,302.00	-160.07	2,582.79	14,444,751.80	1,729,525.83	39.77442476	-80.68285231

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
700.00	700.00	0.00	0.00	KOP Begin 2°/100' build
950.00	949.68	-3.76	10.23	Begin 5.00° tangent
1,301.66	1,300.00	-14.33	39.00	Begin 2°/100' build/turn
2,051.66	2,030.13	-70.17	190.93	Begin 20.00° lateral section
3,190.18	3,100.00	-204.50	556.43	Begin 3°/100' build/turn
3,900.60	3,707.74	-319.51	897.50	Begin 41.28° tangent
6,380.85	5,571.56	-820.63	2,455.28	Begin 10°/100' build/turn
7,582.17	6,302.00	-160.07	2,582.79	Begin 91.00° lateral section
13,621.23	6,197.00	5,069.12	-438.28	PBHL/TD 13621.23 MD/6197.00 TVD

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WW-9  
(4/16)

API Number 47 - 051 -  
Operator's Well No. Keith Stern N-6HM

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 (HUUC 10) Fish Creek Quadrangle Glen Easton 7.5'

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

Will a pit be used? Yes  No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Additives to be used in drilling medium? Barite for weight

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

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EQ#1385426)

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

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

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

Company Official Signature Jim Pancake  
Company Official (Typed Name) Jim Pancake  
Company Official Title Vice President Geoscience

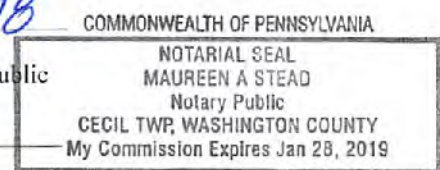
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Subscribed and sworn before me this 2 day of Aug, 2018  
Maureen A Stead Notary Public

My commission expires 1/28/19



**Tug Hill Operating, LLC**

Proposed Revegetation Treatment: Acres Disturbed 19.18 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

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

**Attach:**

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Nicholas*

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Title: Oil and Gas Inspector

Date: 8/1/18

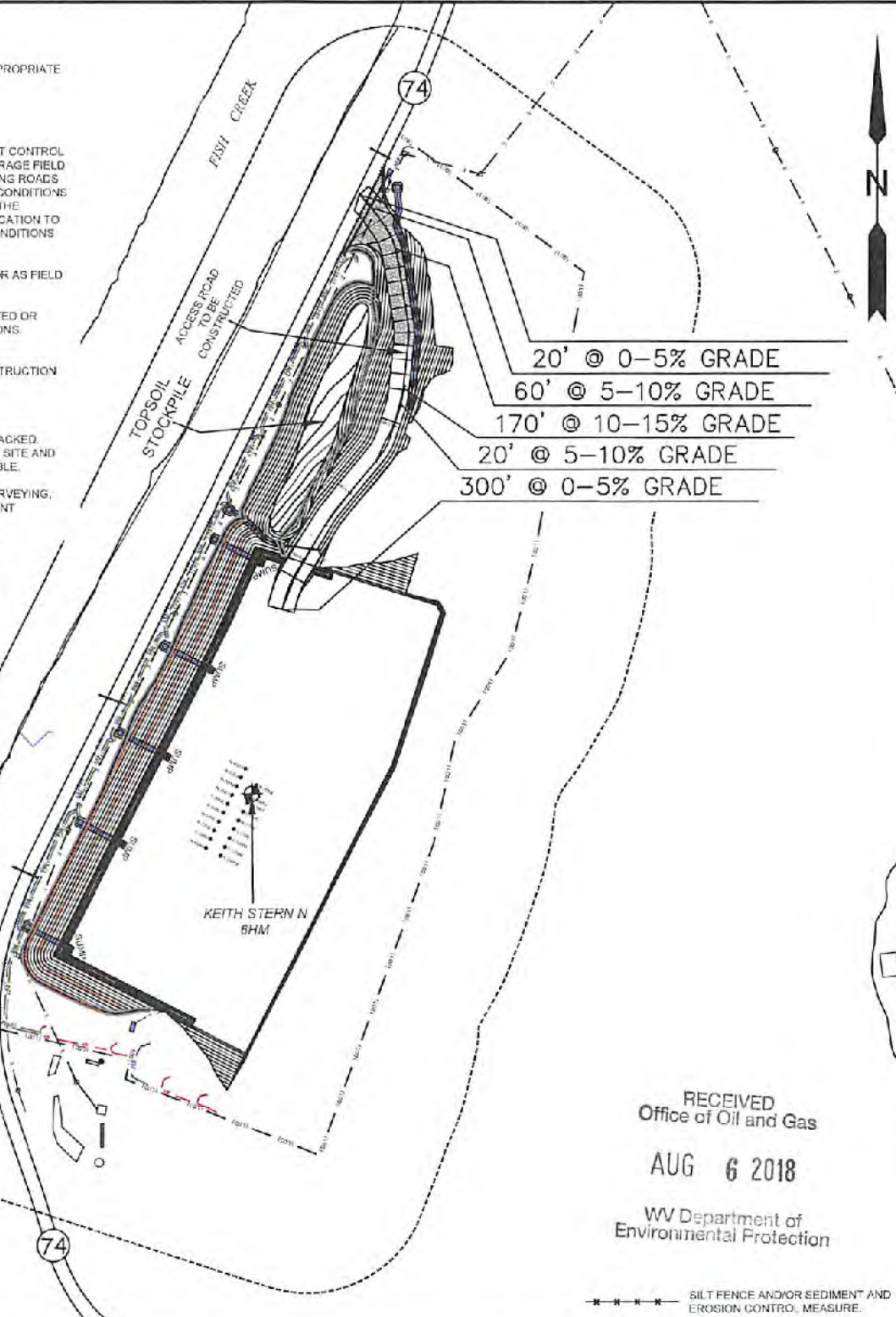
Field Reviewed? (  ) Yes (  ) No

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# PROPOSED KEITH STERN N - 6HM

**NOTES:**

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



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\*\*\*\*\* SILT FENCE AND/OR SEDIMENT AND EROSION CONTROL MEASURE.

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Solutions from the ground up.  
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www.slsurveys.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5'		PREPARED FOR: TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	
COUNTY	DISTRICT		
MARSHALL	MEADE		
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8811	07/31/2018	NONE

**TUG HILL**  
OPERATING



# Well Site Safety Plan

## Tug Hill Operating, LLC

*JK*  
*8/1/18*

Well Name: Keith Stern N-6HM

Pad Location: Keith Stern Pad

Marshall County, West Virginia

UTM meters , NADD83, Zone 17:

Northing: 4,402,817.94

Easting: 526,373.29

August 2018

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WW-9

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# PROPOSED KEITH STERN N - 6HM

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 N WELL PAD LOCATION.



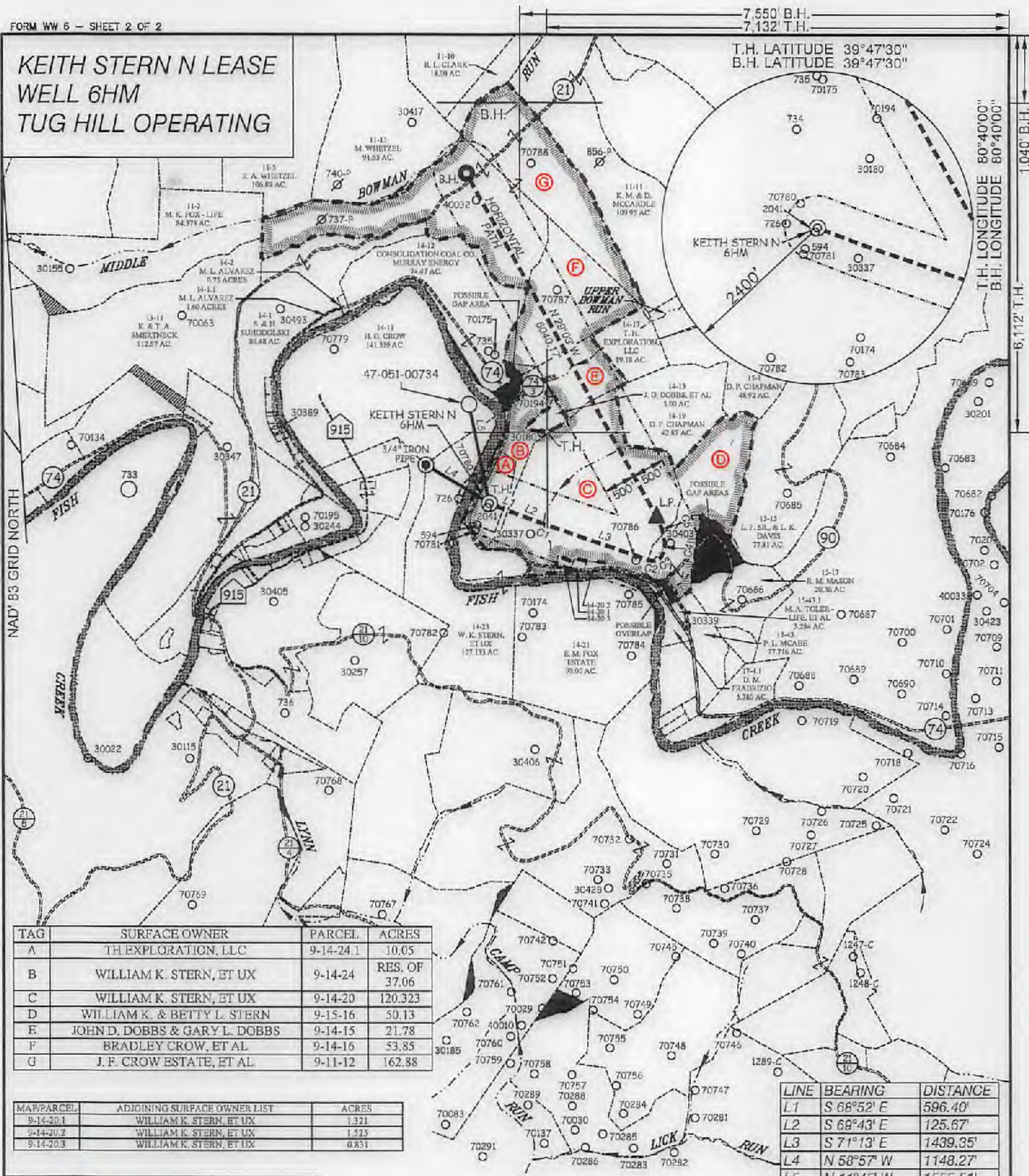
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www.slsurveys.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5'		PREPARED FOR:	
COUNTY	DISTRICT	TUG HILL OPERATING, LLC	
MARSHALL	MEADE	380 SOUTHPOINTE BLVD	
DRAWN BY		DATE	SCALE
K.G.M.		07/31/2018	1" = 2000'



**TUG HILL**  
OPERATING

**KEITH STERN N LEASE  
WELL 6HM  
TUG HILL OPERATING**



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

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

TAG	SURFACE OWNER	PARCEL	ACRES
A	TH EXPLORATION, LLC	9-14-24.1	10.05
B	WILLIAM K. STERN, ET UX	9-14-24	RES. OF 37.06
C	WILLIAM K. STERN, ET UX	9-14-20	120.323
D	WILLIAM K. & BETTY L. STERN	9-15-16	50.13
E	JOHN D. DOBBS & GARY L. DOBBS	9-14-15	21.78
F	BRADLEY CROW, ET AL	9-14-16	53.85
G	J. F. CROW ESTATE, ET AL	9-11-12	162.88

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	1.323
9-14-20.3	WILLIAM K. STERN, ET UX	0.831

LINE	BEARING	DISTANCE
L1	S 68°52' E	596.40'
L2	S 68°43' E	125.67'
L3	S 71°13' E	1439.35'
L4	N 58°57' W	1148.27'
L5	N 11°45' W	1555.51'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	428.83'	29395.35'	S 71°00' E	428.62'
C2	127.33'	228.66'	S 86°02' E	125.69'
C3	161.80'	172.61'	N 46°19' E	155.94'
C4	178.81'	388.93'	N 07°17' E	177.24'
C5	405.88'	963.31'	N 17°38' W	402.68'

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(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)  
 NAD83 S.P.C.(FT) N. 486,576.84 E. 1,633,468.23  
 NAD83 GEO. LAT-(N) 39.774889 LONG-(W) 80.692043  
 NAD83 UTM (M) N. 4,402,817.94 E. 526,373.29  
**LANDING POINT**  
 NAD83 S.P.C.(FT) N. 486,373.6 E. 1,636,048.9  
 NAD83 GEO. LAT-(N) 39.774425 LONG-(W) 80.692852  
 NAD83 UTM (M) N. 4,402,769.2 E. 527,160.5  
**BOTTOM HOLE**  
 NAD83 S.P.C.(FT) N. 471,854.2 E. 1,633,118.6  
 NAD83 GEO. LAT-(N) 39.798814 LONG-(W) 80.693534  
 NAD83 UTM (M) N. 4,404,363.0 E. 526,240.3

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

P.S. 677

**LEGEND**

LEASE LINE	
SURFACE LINE	
WELL LATERAL	
OFFSET LINE	
TIE LINE	
CREEK	
ROAD	
COUNTY ROUTE	
PROPOSED WELL	
EXISTING WELL	
PERMITTED WELL	
TAX MAP-PARCEL	00-00
LEASE # (SEE WW-6A1)	
SURFACE OWNER (SEE TABLE)	

SCALE 1" = 2000' FILE NO. 8811P6HMv2.dwg  
 DATE JULY 31, 2018  
 REVISED \_\_\_\_\_, 20\_\_\_\_  
 OPERATORS WELL NO. KEITH STERN N-6HM  
 API WELL 47 - 051 - 02098  
 NO. STATE COUNTY PERMIT

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

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

COUNTY NAME \_\_\_\_\_  
 PERMIT \_\_\_\_\_

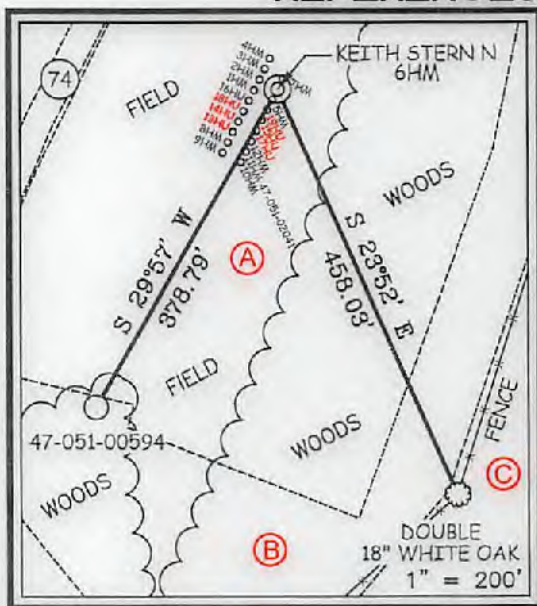
**KEITH STERN N LEASE  
WELL 6HM  
TUG HILL OPERATING**

7,550' B.H.  
7,132' T.H.  
T.H. LATITUDE 39°47'30"  
B.H. LATITUDE 39°47'30"

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)		
NAD'83 S.P.C.(FT)	N. 466,576.84	E. 1,633,468.23
NAD'83 GEO.	LAT-(N) 39.774809	LONG-(W) 80.692043
NAD'83 UTM (M)	N. 4,402,817.94	E. 526,373.29
LANDING POINT		
NAD'83 S.P.C.(FT)	N. 466,373.6	E. 1,636,048.9
NAD'83 GEO.	LAT-(N) 39.774425	LONG-(W) 80.682852
NAD'83 UTM (M)	N. 4,402,769.2	E. 527,160.5
BOTTOM HOLE		
NAD'83 S.P.C.(FT)	N. 471,654.2	E. 1,633,116.6
NAD'83 GEO.	LAT-(N) 39.786814	LONG-(W) 80.693564
NAD'83 UTM (M)	N. 4,404,963.0	E. 526,240.3

T.H. LONGITUDE 80°40'00"  
B.H. LONGITUDE 80°40'00"  
1,040' B.H.  
6,112' T.H.

**REFERENCES**



**NOTES ON SURVEY**

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'

*ju 8/1/18*



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

P.S. 677 *Gregory A. Smith*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE JULY 31, 20 18  
 REVISED \_\_\_\_\_, 20 \_\_\_\_  
 OPERATORS WELL NO. KEITH STERN N-6HM  
 API WELL NO. 47 - 051 - 02098  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8811P6HMv2.dwg  
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

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

LOCATION: ELEVATION GROUND = 741.50' PROPOSED = 744.85' 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 - SEE WW-6A1 ACREAGE 10.05±  
 PROPOSED WORK: LEASE NO. SEE WW-6A1

DRILL X CONVERT \_\_\_\_\_ DRILL DEEPER \_\_\_\_\_ REDRILL \_\_\_\_\_ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION \_\_\_\_\_ PERFORATE NEW FORMATION \_\_\_\_\_ PLUG AND ABANDON \_\_\_\_\_ CLEAN OUT AND REPLUG \_\_\_\_\_ OTHER \_\_\_\_\_  
 PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH TVD: 6,413' / TMD: 13,621'

WELL OPERATOR TUG HILL OPERATING, LLC  
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107

DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM  
 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME PERMIT

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
----------------------	-----------------------	-----------------------	---------	-----------

\*See attached pages

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

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

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

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

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

Lease No.	Trp	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment		
10*15605	A	9-14-24.1	ISAAC CROW ET UX	JOHN G CRAWFORD	1/8+	74	394	148/389 Wheeling Natural Gas Company to Manufacturers Light & Heat Company	197/120 Manufacturers Light & Heat Company to Union Gasoline & Oil Corporation	2/136 Union Gasoline & Oil Corporation to Preston Oil Company	2/235 Preston Oil Company to Manufacturers Light & Heat Company	422/204 Manufacturers Light & Heat Company to Columbia Gas Transmission Corporation	537/518 Columbia Gas Transmission Corporation to Columbia Natural Resources, Inc	13/623 Columbia Natural Resources, Inc. to Nicole Gas Production, LTD	619/699 Nicole Gas Production, LTD to and Nicole Energy Marketing, Inc. to Pennsylvania Land Holdings Corporation	14/471 Dennis N. Broglio, Successor Trustee to Tri-County Oil & Gas, Inc.	Certificate of Merger Tri-County Oil and Gas, Inc. and Leatherwood, Inc.	42/40 CNK Gas Company LLC to TH Exploration, LLC
10*15605	B	9-14-24	ISAAC CROW ET UX	JOHN G CRAWFORD	1/8+	74	394	148/389 Wheeling Natural Gas Company to Manufacturers Light & Heat Company	197/120 Manufacturers Light & Heat Company to Union Gasoline & Oil Corporation	2/136 Union Gasoline & Oil Corporation to Preston Oil Company	2/235 Preston Oil Company to Manufacturers Light & Heat Company	422/204 Manufacturers Light & Heat Company to Columbia Gas Transmission Corporation	537/518 Columbia Gas Transmission Corporation to Columbia Natural Resources, Inc	13/623 Columbia Natural Resources, Inc. to Nicole Gas Production, LTD	619/699 Nicole Gas Production, LTD to and Nicole Energy Marketing, Inc. to Pennsylvania Land Holdings Corporation	14/471 Dennis N. Broglio, Successor Trustee to Tri-County Oil & Gas, Inc.	Certificate of Merger Tri-County Oil and Gas, Inc. and Leatherwood, Inc.	42/40 CNK Gas Company LLC to TH Exploration, LLC
10*15609	C	9-14-20	WILLIAM K STERN AND BETTY L STERN	NPAR, LLC	1/8+	718	320	NA	NA	NA	NA	NA	NA	NA	24/466 NPAR, LLC and AB Resources, LLC to Chief Exploration & Development, LLC and Reuler 2000 Limited Partnership	26/130 Chief Exploration & Development, LLC, Reuler 2000 Limited Partnership and Enplus Resources (USA) Corporation to Chevron U.S.A., Inc.	756/332 NPAR, LLC to Chevron U.S.A., Inc.	36/448 Chevron U.S.A., Inc. to TH Exploration, LLC
10*15813	D	9-15-16	ROBERT B THOMAS	CHESAPEAKE APPALACHIA LLC	1/8+	692	235	NA	NA	NA	NA	NA	NA	33/110 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company, LLC	19/624 SWN Exchange Titleholder LLC and SWN Production Company, LLC merger	36/431 SWN Production Company, LLC to TH Exploration, LLC	
10*21814	D	9-15-16	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	953	335	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21862	D	9-15-16	NOBLE MARCELLUS LP	TH EXPLORATION LLC	1/8+	961	641	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*15818	D	9-15-16	ELIZABETH ANN STRAUSBAUGH	CHESAPEAKE APPALACHIA LLC	1/8+	703	578	NA	NA	NA	NA	NA	NA	29/325 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company, LLC	19/624 SWN Exchange Titleholder LLC and SWN Production Company, LLC merger	36/431 SWN Production Company, LLC to TH Exploration, LLC	
10*15819	D	9-15-16	JANET LEA BLANKENSHIP	CHESAPEAKE APPALACHIA LLC	1/8+	708	114	NA	NA	NA	NA	NA	NA	29/325 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company, LLC	19/624 SWN Exchange Titleholder LLC and SWN Production Company, LLC merger	36/431 SWN Production Company, LLC to TH Exploration, LLC	
10*15814	D	9-15-16	MARY E BASSETT	CHESAPEAKE APPALACHIA LLC	1/8+	694	459	NA	NA	NA	NA	NA	NA	24/84 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company, LLC	19/624 SWN Exchange Titleholder LLC and SWN Production Company, LLC merger	36/431 SWN Production Company, LLC to TH Exploration, LLC	
10*21818	D	9-15-16	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	953	337	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*17445	D	9-15-16	GENEVA BASSETT SANCHEZ	TH EXPLORATION LLC	1/8+	929	292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*15817	D	9-15-16	RUTH MEADOWS	CHESAPEAKE APPALACHIA LLC	1/8+	703	583	NA	NA	NA	NA	NA	NA	29/325 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company, LLC	19/624 SWN Exchange Titleholder LLC and SWN Production Company, LLC merger	36/431 SWN Production Company, LLC to TH Exploration, LLC	

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Lease No.	Trg	Period	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*15815	D	9-15-16	FORREST M THOMAS	CHESAPEAKE APPALACHIA LLC	1/8+	694	516	NA	NA	23/479 Chesapeake Appalachia LLC to Statoil USA Onshore Properties	33/110 Chesapeake Appalachia LLC to SWN Production Company, LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder, LLC and SWN Production Company, LLC merger	36/431 SWN Production Company, LLC to TH Exploration, LLC	
10*15816	D	9-15-16	SALLY CYNTHIA HOPKINS	CHESAPEAKE APPALACHIA LLC	1/8+	697	116	NA	NA	23/512 Chesapeake Appalachia LLC to Statoil USA Onshore Properties	33/110 Chesapeake Appalachia LLC to SWN Production Company, LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder, LLC and SWN Production Company, LLC merger	36/431 SWN Production Company, LLC to TH Exploration, LLC	
10*15592	E	9-14-15	JOHN DANIEL DOBBS	CHESAPEAKE APPALACHIA LLC	1/8+	694	125	NA	NA	23/479 Chesapeake Appalachia LLC to Statoil USA Onshore Properties	24/84 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	30/427 Statoil USA Onshore Properties, Inc (formerly StatoilHydro) to Chevron U.S.A., Inc.	30/461 Chesapeake Appalachia LLC to Chevron U.S.A., Inc.	36/448 Chevron U.S.A., Inc. to TH Exploration, LLC	
10*15593	E	9-14-15	GARY L DOBBS	CHESAPEAKE APPALACHIA LLC	1/8+	693	289	NA	NA	23/479 Chesapeake Appalachia LLC to Statoil USA Onshore Properties	24/84 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	30/427 Statoil USA Onshore Properties, Inc (formerly StatoilHydro) to Chevron U.S.A., Inc.	30/461 Chesapeake Appalachia LLC to Chevron U.S.A., Inc.	36/448 Chevron U.S.A., Inc. to TH Exploration, LLC	
10*19614	E	9-14-15	KAREN SUE BLAKE	TH EXPLORATION LLC	1/8+	937	318	NA	NA	NA	NA	NA	NA	NA	
10*18297	E	9-14-15	ROBERT E WEST	TH EXPLORATION LLC	1/8+	929	279	NA	NA	NA	NA	NA	NA	NA	
10*18189	E	9-14-15	WILLIAM C WEST AND DEBRA WEST	TH EXPLORATION LLC	1/8+	928	622	NA	NA	NA	NA	NA	NA	NA	
10*22629	F	9-14-16	LESA R GODDARD	TH EXPLORATION LLC	1/8+	966	588	NA	NA	NA	NA	NA	NA	NA	
10*22782	F	9-14-16	JULIE LYNN SCOTT	TH EXPLORATION LLC	1/8+	972	43	NA	NA	NA	NA	NA	NA	NA	
10*22543	F	9-14-16	MITCHELL FORRESTER AND CECELIA FORRESTER	TH EXPLORATION LLC	1/8+	966	188	NA	NA	NA	NA	NA	NA	NA	
10*22544	F	9-14-16	MELODIE J HOFF AND DOUGLAS T HOFF	TH EXPLORATION LLC	1/8+	966	191	NA	NA	NA	NA	NA	NA	NA	
10*22602	F	9-14-16	CYNTHIA JO MOORE	TH EXPLORATION LLC	1/8+	966	484	NA	NA	NA	NA	NA	NA	NA	

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Lease No.	Type	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*22603	F	9-14-16	APRIL BERGFORD AND MICHAEL BERGFORD	TH EXPLORATION LLC	1/8+	966	487	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22628	F	9-14-16	JAMES C BALL	TH EXPLORATION LLC	1/8+	966	586	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*23005	F	9-14-16	VIRGINIA AND MICHAEL A CLINGAN	TH EXPLORATION LLC	1/8+	984	40	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*23331	F	9-14-16	JACQUELINE & CHARLES PATTERSON	TH EXPLORATION LLC	1/8+	988	82	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21611	F	9-14-16	KEITH GOUDY AND NANCY GOUDY	TH EXPLORATION LLC	1/8+	959	459	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22522	F	9-14-16	JAMES D COCHRAN AND LINDA M COCHRAN	TH EXPLORATION LLC	1/8+	966	493	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22523	F	9-14-16	DEBRA E MOORE AND SCOTT MOORE	TH EXPLORATION LLC	1/8+	966	490	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22456	F	9-14-16	MICHAEL V GODDARD	TH EXPLORATION LLC	1/8+	964	460	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22457	F	9-14-16	CATHERINE M MESSNER	TH EXPLORATION LLC	1/8+	964	462	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22409	F	9-14-16	LORI ANN OAKS AND LARRY D OAKS	TH EXPLORATION LLC	1/8+	963	121	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22416	F	9-14-16	ADA M MOORE	TH EXPLORATION LLC	1/8+	963	350	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22399	F	9-14-16	WILLIAM T SCHMITT AND PENNY E SCHMITT	TH EXPLORATION LLC	1/8+	963	118	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Traps	Partial	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*22400	F	9-14-16	NANCY A CHURCH & RALPH E CHURCH	TH EXPLORATION LLC	1/8+	963	115	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22401	F	9-14-16	DEBORAH L ONEAL	TH EXPLORATION LLC	1/8+	963	113	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22402	F	9-14-16	RUSSELL B GODDARD	TH EXPLORATION LLC	1/8+	963	111	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22403	F	9-14-16	DONNA M TAYLOR	TH EXPLORATION LLC	1/8+	963	109	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22289	F	9-14-16	KAREN ELAINE WOLFE AND JAMES BRENT WOLFE	TH EXPLORATION LLC	1/8+	962	285	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22290	F	9-14-16	DAVID W HUMMEL SR	TH EXPLORATION LLC	1/8+	962	281	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22297	F	9-14-16	MARK L ADAMS	TH EXPLORATION LLC	1/8+	962	283	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*22151	F	9-14-16	GERALD W LUNA AND CHERIE LUNA	TH EXPLORATION LLC	1/8+	954	342	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21933	F	9-14-16	BRENDA WEEKLEY BEAVER & DANIEL T BEAVER	TH EXPLORATION LLC	1/8+	960	4	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21881	F	9-14-16	HELEN LOUISE HUGHES	TH EXPLORATION LLC	1/8+	953	221	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*17598	F	9-14-16	TERRY LEE PETTIT AND STEPHANIE LYNN PETTIT	TH EXPLORATION LLC	1/8+	921	288	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*17904	F	9-14-16	RICKY LEE AND TAMMY J WATSON	TH EXPLORATION LLC	1/8+	921	213	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Tract	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*18311	F	9-14-16	JOYCE D JONES	TH EXPLORATION LLC /	1/8+	929	339	NA	NA	NA	NA	NA	NA	NA	NA
10*21612	F	9-14-16	YANCY R ARRINGTON AND TERESA C ARRINGTON	TH EXPLORATION LLC /	1/8+	959	457	NA	NA	NA	NA	NA	NA	NA	NA
10*16867	F	9-14-16	APRIL M WEED	TH EXPLORATION LLC /	1/8+	921	279	NA	NA	NA	NA	NA	NA	NA	NA
10*21610	F	9-14-16	THERESA E CREEGER AND GREGORY J CREEGER	TH EXPLORATION LLC /	1/8+	958	467	NA	NA	NA	NA	NA	NA	NA	NA
10*21555	F	9-14-16	HOWARD A BLAKE & HOWARD A BLAKE POA FOR SHARON ANN BLAKE	TH EXPLORATION LLC /	1/8+	957	390	NA	NA	NA	NA	NA	NA	NA	NA
10*17410	F	9-14-16	LILLIE L GAREY	TH EXPLORATION LLC /	1/8+	924	567	NA	NA	NA	NA	NA	NA	NA	NA
10*21477	F	9-14-16	PAUL EUGENE SUTTON SR	TH EXPLORATION LLC /	1/8+	944	136	NA	NA	NA	NA	NA	NA	NA	NA
10*21446	F	9-14-16	LAURA L GORBY	TH EXPLORATION LLC /	1/8+	956	594	NA	NA	NA	NA	NA	NA	NA	NA
10*21447	F	9-14-16	GINA L UPDEGRAFF	TH EXPLORATION LLC /	1/8+	956	596	NA	NA	NA	NA	NA	NA	NA	NA
10*21413	F	9-14-16	CHIKAKO YAMASHIRO HIZER	TH EXPLORATION LLC /	1/8+	956	598	NA	NA	NA	NA	NA	NA	NA	NA
10*21340	F	9-14-16	MARY ANH BURNS AND SIDNEY P BURNS	TH EXPLORATION LLC /	1/8+	953	214	NA	NA	NA	NA	NA	NA	NA	NA
10*21338	F	9-14-16	DOROTHY I WHITE	TH EXPLORATION LLC /	1/8+	953	217	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Type	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*21339	F	9-14-16	MICHAEL W SMITH	TH EXPLORATION LLC /	1/8*	953	212	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21247	F	9-14-16	GLORIA LUCAS	TH EXPLORATION LLC /	1/8*	953	57	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21248	F	9-14-16	ESSIE BUCHANAN	TH EXPLORATION LLC /	1/8*	953	219	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21249	F	9-14-16	PEGGY HARTLEY	TH EXPLORATION LLC /	1/8*	953	55	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18713	F	9-14-16	GEORGE A JOHNS JR AND KAREN L JOHNS	TH EXPLORATION LLC /	1/8*	938	275	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19836	F	9-14-16	SUSAN E MARTIN	TH EXPLORATION LLC /	1/8*	945	582	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19837	F	9-14-16	SHARON K LEONARD	TH EXPLORATION LLC /	1/8*	944	440	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19839	F	9-14-16	PAMELA DOYLE BROWN	TH EXPLORATION LLC /	1/8*	945	584	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19890	F	9-14-16	JO ANN FORESTER	TH EXPLORATION LLC /	1/8*	948	569	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19891	F	9-14-16	TWILA I GORDON AND ALEXANDER J GORDON	TH EXPLORATION LLC /	1/8*	945	475	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19974	F	9-14-16	RONDAL SKELTON AND THOMAS A SKELTON	TH EXPLORATION LLC /	1/8*	948	200	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21049	F	9-14-16	JOHN J HENRY III	TH EXPLORATION LLC /	1/8*	951	175	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Tract	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*21134	F	9-14-16	NANCY JULLOM	TH EXPLORATION LLC /	1/8+	951	179	NA	NA	NA	NA	NA	NA	NA	NA
10*21135	F	9-14-16	CHARLES K NATIONS	TH EXPLORATION LLC /	1/8+	953	53	NA	NA	NA	NA	NA	NA	NA	NA
10*21136	F	9-14-16	STEVEN J KIM AND LUCIA B KIM	TH EXPLORATION LLC /	1/8+	953	51	NA	NA	NA	NA	NA	NA	NA	NA
10*21137	F	9-14-16	GLORIA JEAN SELMON	TH EXPLORATION LLC /	1/8+	951	177	NA	NA	NA	NA	NA	NA	NA	NA
10*21187	F	9-14-16	JEFFREY S HIZER AND BONNIE LYNN HIZER	TH EXPLORATION LLC /	1/8+	951	183	NA	NA	NA	NA	NA	NA	NA	NA
10*21188	F	9-14-16	TERRY S WEEKLEY AND KRISTAL D WEEKLEY	TH EXPLORATION LLC /	1/8+	951	181	NA	NA	NA	NA	NA	NA	NA	NA
10*19609	F	9-14-16	LLOYD T HALL AND LORNA K HALL	TH EXPLORATION LLC /	1/8+	937	320	NA	NA	NA	NA	NA	NA	NA	NA
10*18575	F	9-14-16	DEAN P PENNINGTON	TH EXPLORATION LLC /	1/8+	935	14	NA	NA	NA	NA	NA	NA	NA	NA
10*17403	F	9-14-16	JAMES B CROW AND PENNY G CROW	TH EXPLORATION LLC /	1/8+	925	187	NA	NA	NA	NA	NA	NA	NA	NA
10*17404	F	9-14-16	BRIAN K CROW	TH EXPLORATION LLC /	1/8+	925	185	NA	NA	NA	NA	NA	NA	NA	NA
10*17381	F	9-14-16	CINDY J AND DARRRELL FOLKS	TH EXPLORATION LLC /	1/8+	921	268	NA	NA	NA	NA	NA	NA	NA	NA
10*17380	F	9-14-16	HAROLD B CROW AND CONNIE SUE CROW	TH EXPLORATION LLC /	1/8+	921	207	NA	NA	NA	NA	NA	NA	NA	NA

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Office of Oil and Gas

AUG 6 2018

Lease No.	Trp	Period	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*17358	F	9-14-16	KAREN LOUISE AND ROGER L DUNHAM	TH EXPLORATION LLC /	1/8*	921	254	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21059	F	9-14-16	JOHN B HIZER AND SONYA L HIZER	TH EXPLORATION LLC /	1/8*	951	172	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21060	F	9-14-16	PETER DOMINICK DENON & DENISE J DENON	TH EXPLORATION LLC /	1/8*	951	170	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21038	F	9-14-16	LAURA A WALSH AND MICHAEL P WALSH SR	TH EXPLORATION LLC /	1/8*	951	188	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21040	F	9-14-16	VICKI L POND AND SIDNEY P POND	TH EXPLORATION LLC /	1/8*	949	360	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*21010	F	9-14-16	ISA A HALL AND KYLE W HALL	TH EXPLORATION LLC /	1/8*	951	185	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*15469	F	9-14-16	HARRIET J ANDERSON	TH EXPLORATION LLC /	1/8*	920	11	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*15476	F	9-14-16	CURTIS W WEST JR AND DIANE WEST	TH EXPLORATION LLC /	1/8*	921	263	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19840	F	9-14-16	PHYLIS JEAN CROW HEWITT	TH EXPLORATION LLC /	1/8*	945	586	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19664	F	9-14-16	PAUL EUGENE SUTTON JR & NICOLE L SUTTON	TH EXPLORATION LLC /	1/8*	944	436	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19665	F	9-14-16	GAIL L SUTTON	TH EXPLORATION LLC /	1/8*	944	138	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*19603	F	9-14-16	JAMES KEITH NATIONS BY GUARDIAN AD LITEM DAVID C WHITE ESQ	TH EXPLORATION LLC /	1/8*	944	134	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Office of Oil and Gas

AUG 6 2018

Lease No.	Type	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*18953	F	9-14-16	CYNTHIA M GROSS AND MICHAEL D GROSS	TH EXPLORATION LLC /	1/8*	941	299	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18954	F	9-14-16	ROBERT E TOEPPER JR AND ELIZABETH A TOEPPER	TH EXPLORATION LLC /	1/8*	941	295	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18955	F	9-14-16	CHARLES W LADNER	TH EXPLORATION LLC /	1/8*	941	293	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18956	F	9-14-16	MICHELE T VALKEO	TH EXPLORATION LLC /	1/8*	941	297	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18939	F	9-14-16	PEGGY J CROW	TH EXPLORATION LLC /	1/8*	939	384	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18940	F	9-14-16	STEVEN T JOHNS AND KAREN A JOHNS	TH EXPLORATION LLC /	1/8*	939	277	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18941	F	9-14-16	MARGARET E JONES AND CHARLES T JONES	TH EXPLORATION LLC /	1/8*	939	393	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18942	F	9-14-16	MARY JO ROCKEY	TH EXPLORATION LLC /	1/8*	939	391	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18831	F	9-14-16	JACQUELYN A ROBERTS	TH EXPLORATION LLC /	1/8*	937	395	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18832	F	9-14-16	DAN HELTON AND PEGGY ANNA HELTON	TH EXPLORATION LLC /	1/8*	937	397	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18833	F	9-14-16	WILLIAM J LULLOM	TH EXPLORATION LLC /	1/8*	937	399	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18834	F	9-14-16	JAMES R ROCKEY	TH EXPLORATION LLC /	1/8*	938	1	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Office of Oil and Gas

AUG 6 2018

Lease No.	Tract	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*18830	F	9-14-16	GERALD O. MOORE AND SLYVIA JUDITH MOORE	TH EXPLORATION LLC	1/8+	937	393	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18705	F	9-14-16	DOLORES JEAN POLAND	TH EXPLORATION LLC	1/8+	938	535	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18708	F	9-14-16	DELORES KOJAKOWSKI	TH EXPLORATION LLC	1/8+	938	540	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18709	F	9-14-16	CONSTANCE M SIMPSON AND DANIEL L SIMPSON	TH EXPLORATION LLC	1/8+	938	537	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18710	F	9-14-16	LEWIS M QUIGLEY AND MAXINE V QUIGLEY	TH EXPLORATION LLC	1/8+	938	267	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18711	F	9-14-16	H GLENN CROW	TH EXPLORATION LLC	1/8+	938	269	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18712	F	9-14-16	KENNETH R BURCH	TH EXPLORATION LLC	1/8+	938	272	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18310	F	9-14-16	VIRGINIA A PASQUALUCCI	TH EXPLORATION LLC	1/8+	945	478	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18303	F	9-14-16	WILLIAM E MOORE AND CYNTHIA M MOORE	TH EXPLORATION LLC	1/8+	944	438	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18303	F	9-14-16	WILLIAM E MOORE AND CYNTHIA M MOORE	TH EXPLORATION LLC	1/8+	944	438	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18627	F	9-14-16	GERALDINE MAY SPONAUGLE AND JUNIOR RICHARD SPONAUGLE	TH EXPLORATION LLC	1/8+	936	234	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*18629	F	9-14-16	THOMAS D LILLOM AND CATHERINE A LILLOM	TH EXPLORATION LLC	1/8+	936	230	NA	NA	NA	NA	NA	NA	NA	NA	NA

RECEIVED  
Office of Oil and Gas

AUG 6 2018

Lease No.	Type	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*18630	F	9-14-16	TIMOTHY D ULLOM AND NANCY M ULLOM	TH EXPLORATION LLC ✓	1/8+	936	232	NA	NA	NA	NA	NA	NA	NA	NA
10*18634	F	9-14-16	KATHRYN E SBURT	TH EXPLORATION LLC ✓	1/8+	936	236	NA	NA	NA	NA	NA	NA	NA	NA
10*18635	F	9-14-16	GLADYS CROW	TH EXPLORATION LLC ✓	1/8+	936	238	NA	NA	NA	NA	NA	NA	NA	NA
10*18576	F	9-14-16	SCOTT D VANNEWHOUSE	TH EXPLORATION LLC ✓	1/8+	935	12	NA	NA	NA	NA	NA	NA	NA	NA
10*18611	F	9-14-16	DARYL MCGUFFIN AND MALENA H MCGUFFIN	TH EXPLORATION LLC ✓	1/8+	934	598	NA	NA	NA	NA	NA	NA	NA	NA
10*19506	F	9-14-16	MARK R MOORE AND ASHLYN C MOORE	TH EXPLORATION LLC ✓	1/8+	942	610	NA	NA	NA	NA	NA	NA	NA	NA
10*18577	F	9-14-16	KELLY ANN DENON	TH EXPLORATION LLC ✓	1/8+	935	10	NA	NA	NA	NA	NA	NA	NA	NA
10*18578	F	9-14-16	KIMBERLY ELLEN DENON	TH EXPLORATION LLC ✓	1/8+	935	8	NA	NA	NA	NA	NA	NA	NA	NA
10*18579	F	9-14-16	ROGER EDWARD DENON JR	TH EXPLORATION LLC ✓	1/8+	935	6	NA	NA	NA	NA	NA	NA	NA	NA
10*18580	F	9-14-16	BRADLEY R CROW	TH EXPLORATION LLC ✓	1/8+	935	4	NA	NA	NA	NA	NA	NA	NA	NA
10*18574	F	9-14-16	DAE MARIE WARDEN	TH EXPLORATION LLC ✓	1/8+	935	24	NA	NA	NA	NA	NA	NA	NA	NA
10*18457	F	9-14-16	SHEILA M KRULL AND JAMES W KRULL	TH EXPLORATION LLC ✓	1/8+	933	177	NA	NA	NA	NA	NA	NA	NA	NA

RECEIVED  
Office of Oil and Gas

AUG 6 2018

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*17359	F	9-14-16	JULIA ALLISON CROW	TH EXPLORATION LLC	1/8*	921	224	NA	NA	NA	NA	NA	NA	NA	NA
10*18523	F	9-14-16	KENT R HARRIS	TH EXPLORATION LLC	1/8*	933	600	NA	NA	NA	NA	NA	NA	NA	NA
10*18525	F	9-14-16	WAYNE M CERMAK	TH EXPLORATION LLC	1/8*	933	594	NA	NA	NA	NA	NA	NA	NA	NA
10*17490	F	9-14-16	CONNIE SUE DOUGLAS AND RONNIE J DOUGLAS	TH EXPLORATION LLC	1/8*	924	578	NA	NA	NA	NA	NA	NA	NA	NA
10*17491	F	9-14-16	THOMAS LEE AND CLARA J HAUGHT	TH EXPLORATION LLC	1/8*	924	575	NA	NA	NA	NA	NA	NA	NA	NA
10*18466	F	9-14-16	REBECCA M PENNINGTON	TH EXPLORATION LLC	1/8*	933	154	NA	NA	NA	NA	NA	NA	NA	NA
10*18467	F	9-14-16	SAMANTHA L BOYLES AND DARRELL BOYLES	TH EXPLORATION LLC	1/8*	933	145	NA	NA	NA	NA	NA	NA	NA	NA
10*18468	F	9-14-16	PATTY J LUCTIS AND GEORGE LUCTIS	TH EXPLORATION LLC	1/8*	933	142	NA	NA	NA	NA	NA	NA	NA	NA
10*18459	F	9-14-16	SANDRA K NELSON AND RICKEY A NELSON	TH EXPLORATION LLC	1/8*	933	174	NA	NA	NA	NA	NA	NA	NA	NA
10*18460	F	9-14-16	ROBERT W CERMAK AND PATRICIA LYNE CERMA	TH EXPLORATION LLC	1/8*	933	171	NA	NA	NA	NA	NA	NA	NA	NA
10*18461	F	9-14-16	STEVEN E ROUNION AND JAN M ROUNION	TH EXPLORATION LLC	1/8*	933	168	NA	NA	NA	NA	NA	NA	NA	NA
10*18462	F	9-14-16	NANCY L PAULETTE AND JOSEPH L PAULETTE	TH EXPLORATION LLC	1/8*	933	165	NA	NA	NA	NA	NA	NA	NA	NA

RECEIVED  
Office of Oil and Gas

AUG 6 2018



Lease No.	Tract	Parcel	Lessee	Leases	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*18463	F	9-14-16	MILANA L REDLINGER AND ROBERT W REDLINGER	TH EXPLORATION LLC	1/8+	933	162	NA	NA	NA	NA	NA	NA	NA	NA
10*18464	F	9-14-16	ROBERTA J EDDY AND RONALD D EDDY	TH EXPLORATION LLC	1/8+	933	159	NA	NA	NA	NA	NA	NA	NA	NA
10*18465	F	9-14-16	GAYLE C HATHAWAY	TH EXPLORATION LLC	1/8+	933	156	NA	NA	NA	NA	NA	NA	NA	NA
10*17420	F	9-14-16	DAVID LEE AND ANN F BAKER	TH EXPLORATION LLC	1/8+	924	564	NA	NA	NA	NA	NA	NA	NA	NA
10*17391	F	9-14-16	BETTY LOU AND OLLIE CHARLES HUGGINS	TH EXPLORATION LLC	1/8+	921	210	NA	NA	NA	NA	NA	NA	NA	NA
10*17392	F	9-14-16	BEVERLY KATHRIN GODDARD	TH EXPLORATION LLC	1/8+	920	55	NA	NA	NA	NA	NA	NA	NA	NA
10*17393	F	9-14-16	CHARLE M TURNER AND BESSIE M TURNER	TH EXPLORATION LLC	1/8+	920	39	NA	NA	NA	NA	NA	NA	NA	NA
10*17394	F	9-14-16	JUDY LOUISE GLOVER	TH EXPLORATION LLC	1/8+	921	232	NA	NA	NA	NA	NA	NA	NA	NA
10*17397	F	9-14-16	PAT DARRELL TURNER AND TINA DENISE TURNER	TH EXPLORATION LLC	1/8+	925	117	NA	NA	NA	NA	NA	NA	NA	NA
10*17399	F	9-14-16	RONALD EDWARD WATSON AND DIANA L WATSON	TH EXPLORATION LLC	1/8+	925	120	NA	NA	NA	NA	NA	NA	NA	NA
10*17408	F	9-14-16	WILLIAM JAMES HEDGEETH AND ERIN ELIZABETH HEDGEETH	TH EXPLORATION LLC	1/8+	924	572	NA	NA	NA	NA	NA	NA	NA	NA
10*17382	F	9-14-16	HELEN MARIE AND DAVID E MCCRAY	TH EXPLORATION LLC	1/8+	920	47	NA	NA	NA	NA	NA	NA	NA	NA

RECEIVED  
Office of Oil and Gas

AUG 6 2018

Lease No.	IGB	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*17389	F	9-14-16	MELBA EILEEN HUDDLESTON	TH EXPLORATION LLC /	1/8*	920	53	NA	NA	NA	NA	NA	NA	NA	NA
10*17368	F	9-14-16	DONALD PAUL CROW AND CRYSTAL LYNN CROW	TH EXPLORATION LLC /	1/8*	921	201	NA	NA	NA	NA	NA	NA	NA	NA
10*17369	F	9-14-16	DELORES A WALLACE	TH EXPLORATION LLC	1/8*	920	63	NA	NA	NA	NA	NA	NA	NA	NA
10*17371	F	9-14-16	MACK A AND CAROL A CROW	TH EXPLORATION LLC /	1/8*	921	204	NA	NA	NA	NA	NA	NA	NA	NA
10*17372	F	9-14-16	DONNIE JASON HEDGEPEETH AND KAREN L HEDGEPEETH	TH EXPLORATION LLC /	1/8*	920	42	NA	NA	NA	NA	NA	NA	NA	NA
10*17373	F	9-14-16	NILA F HEDGEPEETH	TH EXPLORATION LLC	1/8*	920	45	NA	NA	NA	NA	NA	NA	NA	NA
10*17374	F	9-14-16	EZRA HOWARD COCHRAN	TH EXPLORATION LLC /	1/8*	920	27	NA	NA	NA	NA	NA	NA	NA	NA
10*17380	F	9-14-16	DEBORAH IRENE PIERCE AND BARRETT LEE PIERCE	TH EXPLORATION LLC /	1/8*	920	34	NA	NA	NA	NA	NA	NA	NA	NA
10*17361	F	9-14-16	SHEILA RAMONA CROW	TH EXPLORATION LLC /	1/8*	920	76	NA	NA	NA	NA	NA	NA	NA	NA
10*17362	F	9-14-16	NILA VIRGINIA AND FREDERICK EUGENE STREIGHT	TH EXPLORATION LLC /	1/8*	921	251	NA	NA	NA	NA	NA	NA	NA	NA
10*17366	F	9-14-16	SYLVIA DEE WOOD	TH EXPLORATION LLC /	1/8*	921	230	NA	NA	NA	NA	NA	NA	NA	NA
10*17367	F	9-14-16	JERRY HOWELL	TH EXPLORATION LLC /	1/8*	920	37	NA	NA	NA	NA	NA	NA	NA	NA

RECEIVED  
Office of Oil and Gas

AUG 6 2018

Lease No.	Trgs	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*18400	F	9-14-16	CHERYL ANN LYPHNAL AND FRANK T YPHNAL	TH EXPLORATION LLC /	1/8+	932	609	NA	NA	NA	NA	NA	NA	NA	NA
10*16971	F	9-14-16	LEONA M SIBURT	TH EXPLORATION LLC /	1/8+	921	238	NA	NA	NA	NA	NA	NA	NA	NA
10*16972	F	9-14-16	SCOTT BRADLEY GRIMM & SHERRY ANN GRIMM	TH EXPLORATION LLC /	1/8+	921	242	NA	NA	NA	NA	NA	NA	NA	NA
10*16973	F	9-14-16	NANCY C KESSELING & CARL E KESSELING	TH EXPLORATION LLC /	1/8+	920	22	NA	NA	NA	NA	NA	NA	NA	NA
10*16916	F	9-14-16	ROGER LEE WEST	TH EXPLORATION LLC /	1/8+	921	277	NA	NA	NA	NA	NA	NA	NA	NA
10*16883	F	9-14-16	VICKIE LYNN PAPE AND JOHN EDWARD PAPE	TH EXPLORATION LLC /	1/8+	921	248	NA	NA	NA	NA	NA	NA	NA	NA
10*16884	F	9-14-16	DELORES A BOWERS & LEONARD B BOWERS	TH EXPLORATION LLC /	1/8+	921	281	NA	NA	NA	NA	NA	NA	NA	NA
10*18348	F	9-14-16	FORREST N SIBURT AND ARLENE G SIBURT	TH EXPLORATION LLC /	1/8+	931	362	NA	NA	NA	NA	NA	NA	NA	NA
10*18349	F	9-14-16	DAWN C GOSKY AND GLENN P GOSKY	TH EXPLORATION LLC /	1/8+	931	365	NA	NA	NA	NA	NA	NA	NA	NA
10*18347	F	9-14-16	ELMA LOU LADNER	TH EXPLORATION LLC /	1/8+	931	397	NA	NA	NA	NA	NA	NA	NA	NA
10*18304	F	9-14-16	EVA L FAWCETT	TH EXPLORATION LLC /	1/8+	929	323	NA	NA	NA	NA	NA	NA	NA	NA
10*18305	F	9-14-16	MARY L WOLFILL AND HARRY H WOLFILL	TH EXPLORATION LLC /	1/8+	929	324	NA	NA	NA	NA	NA	NA	NA	NA

RECEIVED  
Office of Oil and Gas

AUG 6 2018

WV Department of  
Environmental Protection

Lease No.	Trps	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*18306	F	9-14-16	MILAN B MARINCOV AND ELIZABETH E MARINCOV	TH EXPLORATION LLC /	1/8+	929	327	NA	NA	NA	NA	NA	NA	NA	NA
10*18307	F	9-14-16	DEBORAH S KACKLEY AND ROBERT A KACKLEY	TH EXPLORATION LLC /	1/8+	929	330	NA	NA	NA	NA	NA	NA	NA	NA
10*18308	F	9-14-16	LINDA A DAVIS AND JAMES M DAVIS	TH EXPLORATION LLC /	1/8+	929	333	NA	NA	NA	NA	NA	NA	NA	NA
10*18309	F	9-14-16	LARRY W HOBOKEN AND KATHRYN J HOBOKEN	TH EXPLORATION LLC /	1/8+	929	336	NA	NA	NA	NA	NA	NA	NA	NA
10*18550	F	9-14-16	CHARLES LEROY LEACH AND MARTHA G LEACH	TH EXPLORATION LLC /	1/8+	920	19	NA	NA	NA	NA	NA	NA	NA	NA
10*16551	F	9-14-16	JACK L CROW JR AND VIRGINIA L CROW	TH EXPLORATION LLC /	1/8+	921	260	NA	NA	NA	NA	NA	NA	NA	NA
10*18285	F	9-14-16	KATHERINE LYNN SMITH	TH EXPLORATION LLC /	1/8+	929	637	NA	NA	NA	NA	NA	NA	NA	NA
10*16469	F	9-14-16	JAMES EARL AND MARGARET L SIBURT	TH EXPLORATION LLC /	1/8+	921	245	NA	NA	NA	NA	NA	NA	NA	NA
10*16470	F	9-14-16	CARDYNN SUE FRANKLIN AND RAYMOND EUGENE FRANKLIN	TH EXPLORATION LLC /	1/8+	921	219	NA	NA	NA	NA	NA	NA	NA	NA
10*16472	F	9-14-16	JUDY DELORES SIBURT	TH EXPLORATION LLC /	1/8+	929	643	NA	NA	NA	NA	NA	NA	NA	NA
10*16473	F	9-14-16	LINDA ELAINE AND RICHARD LEROY LITTELL	TH EXPLORATION LLC /	1/8+	929	256	NA	NA	NA	NA	NA	NA	NA	NA
10*16474	F	9-14-16	BARBARA KAY SIBURT	TH EXPLORATION LLC /	1/8+	921	266	NA	NA	NA	NA	NA	NA	NA	NA

RECEIVED  
Office of Oil and Gas

AUG 6 2018

WV Department of  
Environmental Protection

Lease No.	Tract	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*16475	F	9-14-16	MARY LOUISE GORBY	TH EXPLORATION LLC /	1/8+	921	234	NA	NA	NA	NA	NA	NA	NA	NA
10*16476	F	9-14-16	ROGER ALLAN AND CYNTHIA L JOHNSON	TH EXPLORATION LLC /	1/8+	921	257	NA	NA	NA	NA	NA	NA	NA	NA
10*16477	F	9-14-16	BRENDA K YOHO	TH EXPLORATION LLC /	1/8+	921	228	NA	NA	NA	NA	NA	NA	NA	NA
10*16425	F	9-14-16	WILLIAM A MASON JR AND ROBIN MASON	TH EXPLORATION LLC /	1/8+	920	25	NA	NA	NA	NA	NA	NA	NA	NA
10*16428	F	9-14-16	BRUCE LYNN JOHNSON AND KIMBERLY A JOHNSON	TH EXPLORATION LLC /	1/8+	920	50	NA	NA	NA	NA	NA	NA	NA	NA
10*16438	F	9-14-16	ALICE MARLENE PERSINGER	TH EXPLORATION LLC /	1/8+	921	236	NA	NA	NA	NA	NA	NA	NA	NA
10*18250	F	9-14-16	BRENDA KAY COFFIELD AND WILLIAM E COFFIELD	TH EXPLORATION LLC /	1/8+	928	546	NA	NA	NA	NA	NA	NA	NA	NA
10*18251	F	9-14-16	BARBARA JEAN TOMASZCZYK AND LAWRENCE M TOMASZCZYK	TH EXPLORATION LLC /	1/8+	928	575	NA	NA	NA	NA	NA	NA	NA	NA
10*18252	F	9-14-16	SHARON L AND DONALD H KAISER	TH EXPLORATION LLC /	1/8+	928	572	NA	NA	NA	NA	NA	NA	NA	NA
10*18253	F	9-14-16	JOHN M SCHRANTZ	TH EXPLORATION LLC /	1/8+	928	569	NA	NA	NA	NA	NA	NA	NA	NA
10*16407	F	9-14-16	JANICE F BROOKOVER	TH EXPLORATION LLC /	1/8+	920	74	NA	NA	NA	NA	NA	NA	NA	NA
10*16408	F	9-14-16	KATHLEEN I FRANCIS	TH EXPLORATION LLC /	1/8+	921	196	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Tract	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*16409	F	9-14-16	JEANETTE M HEATH	TH EXPLORATION LLC /	1/8*	920	72	NA	NA	NA	NA	NA	NA	NA	NA
10*16403	F	9-14-16	WILLIAM C EDGAR AND CHRISTY E EDGAR	TH EXPLORATION LLC /	1/8*	920	61	NA	NA	NA	NA	NA	NA	NA	NA
10*16404	F	9-14-16	KATHRYN M WHIRKEY	TH EXPLORATION LLC /	1/8*	921	194	NA	NA	NA	NA	NA	NA	NA	NA
10*16406	F	9-14-16	ARELENA B HORNER AND QUAY ALLEN HORNER	TH EXPLORATION LLC /	1/8*	921	240	NA	NA	NA	NA	NA	NA	NA	NA
10*16186	F	9-14-16	DEBORAH KAY COOLEY AND ROBERT BECK	TH EXPLORATION LLC /	1/8*	920	65	NA	NA	NA	NA	NA	NA	NA	NA
10*16187	F	9-14-16	PATRICIA D BABI AND JOHN J BABI	TH EXPLORATION LLC /	1/8*	920	31	NA	NA	NA	NA	NA	NA	NA	NA
10*16152	F	9-14-16	CONNIE HECKLE	TH EXPLORATION LLC /	1/8*	920	29	NA	NA	NA	NA	NA	NA	NA	NA
10*16153	F	9-14-16	LARRY JACK EMERY	TH EXPLORATION LLC /	1/8*	920	13	NA	NA	NA	NA	NA	NA	NA	NA
10*17409	F	9-14-16	JUDY A AND CLYDE E ELZEY	TH EXPLORATION LLC /	1/8*	924	569	NA	NA	NA	NA	NA	NA	NA	NA
10*15741	F	9-14-16	LOHRN S GORBY	TH EXPLORATION LLC /	1/8*	929	641	NA	NA	NA	NA	NA	NA	NA	NA
10*15694	F	9-14-16	DEBORAH L MERCER	TH EXPLORATION LLC /	1/8*	921	271	NA	NA	NA	NA	NA	NA	NA	NA
10*15695	F	9-14-16	JOHN F AND LOIS L GORBY	TH EXPLORATION LLC /	1/8*	929	259	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Tap	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*15696	F	9-14-16	JOSEPH JEREMY PALMER	TH EXPLORATION LLC /	1/8+	921	275	NA	NA	NA	NA	NA	NA	NA	NA
10*15488	F	9-14-16	NANCY F FYE & STEPHEN M FYE	TH EXPLORATION LLC /	1/8+	921	226	NA	NA	NA	NA	NA	NA	NA	NA
10*15495	F	9-14-16	BARBARA BARNHART AND WALTER BARNHART	TH EXPLORATION LLC /	1/8+	921	222	NA	NA	NA	NA	NA	NA	NA	NA
10*15470	F	9-14-16	BETTY L LOGES	TH EXPLORATION LLC /	1/8+	921	286	NA	NA	NA	NA	NA	NA	NA	NA
10*15473	F	9-14-16	WILLIAM F MCDONALD AND SHIRLEY MCDONALD	TH EXPLORATION LLC /	1/8+	921	198	NA	NA	NA	NA	NA	NA	NA	NA
10*17401	F	9-14-16	JOHN M HAUGHT JR AND CHERYL A HAUGHT	TH EXPLORATION LLC /	1/8+	925	182	NA	NA	NA	NA	NA	NA	NA	NA
10*17402	F	9-14-16	DIANA LYNN BUNGARDNER	TH EXPLORATION LLC /	1/8+	920	68	NA	NA	NA	NA	NA	NA	NA	NA
10*17958	F	9-14-16	SANDRA MAY RICHMOND	TH EXPLORATION LLC /	1/8+	929	632	NA	NA	NA	NA	NA	NA	NA	NA
10*17902	F	9-14-16	SUSAN LYNN SEDGEMER	TH EXPLORATION LLC /	1/8+	920	59	NA	NA	NA	NA	NA	NA	NA	NA
10*17821	F	9-14-16	GREGORY S CROW	TH EXPLORATION LLC /	1/8+	929	639	NA	NA	NA	NA	NA	NA	NA	NA
10*17811	F	9-14-16	PANSY M ASTON AND EMERL ASTON	TH EXPLORATION LLC /	1/8+	921	216	NA	NA	NA	NA	NA	NA	NA	NA
10*19564	F	9-14-16	ANNA MAY FOLTZ	TH EXPLORATION LLC /	1/8+	934	53	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Tags	Parcel	Lessor	Lessee	Boyerly	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19517	F	9-14-16	EARL B FOLTZ III	TH EXPLORATION LLC /	1/8+	934	57	NA	NA	NA	NA	NA	NA	NA	NA
10*17710	F	9-14-16	DEBRA JEAN LANCASTER AND DARRELL R LANCASTER	TH EXPLORATION LLC /	1/8+	929	634	NA	NA	NA	NA	NA	NA	NA	NA
10*16191	F	9-14-16	MADELYN E MOSSOR DO NOT USE	TH EXPLORATION LLC /	1/8+	920	76	NA	NA	NA	NA	NA	NA	NA	NA
10*16468	F	9-14-16	LARRY W JOHNSON	TH EXPLORATION LLC /	1/8+	920	57	NA	NA	NA	NA	NA	NA	NA	NA
10*16716	F	9-14-16	BERNARD O CROW AND KAREN S CROW	TH EXPLORATION LLC /	1/8+	913	385	NA	NA	NA	NA	NA	NA	NA	NA
10*16548	F	9-14-16	JULIE KAY OUEL AND JEFFREY S OUEL	TH EXPLORATION LLC /	1/8+	909	77	NA	NA	NA	NA	NA	NA	NA	NA
10*16584	F	9-14-16	SHERWOOD O CROW AND GOLDIE CROW	TH EXPLORATION LLC /	1/8+	908	544	NA	NA	NA	NA	NA	NA	NA	NA
10*16338	F	9-14-16	HILDA LEE BLAKE	TH EXPLORATION LLC /	1/8+	910	351	NA	NA	NA	NA	NA	NA	NA	NA
10*16339	F	9-14-16	ROBERT E HARTLEY	TH EXPLORATION LLC /	1/8+	910	343	NA	NA	NA	NA	NA	NA	NA	NA
10*16337	F	9-14-16	WANDA L EMERY AND ELMER H EMERY	TH EXPLORATION LLC /	1/8+	910	347	NA	NA	NA	NA	NA	NA	NA	NA
10*22771	G	9-11-12	KATHARINE B SILBAUGH AND DANIEL JURAY	TH EXPLORATION LLC /	1/8+	970	24	NA	NA	NA	NA	NA	NA	NA	NA
10*23427	G	9-11-12	SANDY AND STEVEN VINCENT	TH EXPLORATION LLC /	1/8+			NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Trps	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*22608	G	9-11-12	SARAH BAIRD LINN	TH EXPLORATION LLC /	1/8+	966	620	NA	NA	NA	NA	NA	NA	NA	NA
10*23389	G	9-11-12	LEESA O THOMPSON	TH EXPLORATION LLC /	1/8+	972	45	NA	NA	NA	NA	NA	NA	NA	NA
10*22855	G	9-11-12	KIM O MAGHAN AND JAMES G MAGHAN	TH EXPLORATION LLC /	1/8+	977	49	NA	NA	NA	NA	NA	NA	NA	NA
10*22666	G	9-11-12	JOSEPH W LINN JR AND TAMMY S LINN	TH EXPLORATION LLC /	1/8+	968	230	NA	NA	NA	NA	NA	NA	NA	NA
10*23322	G	9-11-12	JOHN E MEAD	TH EXPLORATION LLC /	1/8+	968	39	NA	NA	NA	NA	NA	NA	NA	NA
10*21495	G	9-11-12	ELEN BAIRD AND GEORGE S BAIRD AMENDED REVOCABLE TRUST AGREEMENT	TH EXPLORATION LLC /	1/8+	966	618	NA	NA	NA	NA	NA	NA	NA	NA
10*22462	G	9-11-12	ROBERT CALDWELL MEAD	TH EXPLORATION LLC /	1/8+	964	490	NA	NA	NA	NA	NA	NA	NA	NA
10*22153	G	9-11-12	JODY A SCHOTTLER AND THOMAS A SCHOTTLER	TH EXPLORATION LLC /	1/8+	953	470	NA	NA	NA	NA	NA	NA	NA	NA
10*22090	G	9-11-12	KATHERINE ANN BOYD BLAWE	TH EXPLORATION LLC /	1/8+	953	473	NA	NA	NA	NA	NA	NA	NA	NA
10*23165	G	9-11-12	EDITH L AND WENDELL F ORR	TH EXPLORATION LLC /	1/8+	984	68	NA	NA	NA	NA	NA	NA	NA	NA
10*23169	G	9-11-12	INA GALE CARPENTER	TH EXPLORATION LLC /	1/8+	965	425	NA	NA	NA	NA	NA	NA	NA	NA
10*23059	G	9-11-12	GAIL W STEWART	TH EXPLORATION LLC /	1/8+	977	287	NA	NA	NA	NA	NA	NA	NA	NA

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Lease No.	Trp	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*21923	G	9-11-12	DOROTHY JEAN BURKLE BOYD	TH EXPLORATION LLC ✓	1/8+	933	468	NA	NA	NA	NA	NA	NA	NA	NA
10*21843	G	9-11-12	JOHN B HOAGLAND AND PATRICIA A HOAGLAND	TH EXPLORATION LLC ✓	1/8+	959	620	NA	NA	NA	NA	NA	NA	NA	NA
10*22024	G	9-11-12	KATHRYN A AND EVERETT TAGGART	TH EXPLORATION LLC ✓	1/8+	977	289	NA	NA	NA	NA	NA	NA	NA	NA
10*21492	G	9-11-12	JUDITH FISK	TH EXPLORATION LLC ✓	1/8+	957	282	NA	NA	NA	NA	NA	NA	NA	NA
10*21494	G	9-11-12	EILEEN M SLATE AND DALE A SLATE	TH EXPLORATION LLC ✓	1/8+	957	284	NA	NA	NA	NA	NA	NA	NA	NA
10*21093	G	9-11-12	DUNCAN S LINN AND POLLY LU BROWN	TH EXPLORATION LLC ✓	1/8+	952	157	NA	NA	NA	NA	NA	NA	NA	NA
10*19685	G	9-11-12	MORGAN H MOSSER AND NANCY MOSSER	TH EXPLORATION LLC ✓	1/8+	944	445	NA	NA	NA	NA	NA	NA	NA	NA

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AFFIDAVIT

STATE OF TEXAS       §  
                                  § SS  
COUNTY OF TARRANT   §

On this 18<sup>th</sup> day of October, 2016, before me, the undersigned authority, personally appeared David D. Kalish ("Affiant") who being first duly sworn under oath, deposes and saith:

1. TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC are wholly owned subsidiaries of THQ Appalachia I, LLC.
2. Tug Hill Operating, LLC provides oil and gas operations services to THQ Appalachia I, LLC under an Operating Services Agreement dated July 23, 2014.
3. David D. Kalish, the Affiant, is the Vice President of Tug Hill Operating, LLC, THQ Appalachia I, LLC, TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC, and;
3. Tug Hill Operating, LLC is authorized to operate and maintain the assets owned by THQ Appalachia I, LLC, including, as referenced above, TH Exploration, LLC, TH Exploration II, LLC, and TH Exploration III, LLC, including oil and gas leases, wells, pipelines, surface facilities, and other all other assets that support the business of THQ Appalachia I, LLC, and;
4. Specifically, Tug Hill Operating, LLC is authorized to submit and obtain well work permits and carry out all activities pursuant to such work permits for assets owned by TH Exploration, LLC, TH Exploration II, LLC, TH Exploration III, LLC.

FURTHER, AFFIANT SAITH NOT.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this 18<sup>th</sup> day of October, 2016.

David D. Kalish  
Affiant: David D. Kalish

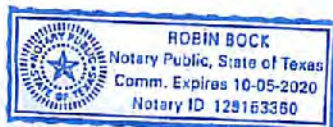
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Jan Pest  
MARSHALL County 03:44:28 PM  
Instrument No 1416299  
Date Recorded 10/19/2016  
Document Type HIS  
Pages Recorded 1  
Book-Page 28-62  
Recording Fee \$5.00  
Additional \$6.00

STATE OF TEXAS       §  
                                  § SS  
COUNTY OF TARRANT   §

Sworn and subscribed to (or affirmed) before me on this, the 18<sup>th</sup> day of October, 2016, by David D. Kalish

IN WITNESS WHEREOF, I hereunto set my hand and official seal.



My Commission Expires: 10-05-2020

Signature/Notary Public: Robin Bock

Name/Notary Public (Print): Robin Bock

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PARTIAL ASSIGNMENT OF OIL AND GAS LEASES

This PARTIAL ASSIGNMENT OF OIL AND GAS LEASES (hereinafter, "Assignment"), made the 31 day of May, 2018 (hereinafter, "Effective Date"), is by and between CNX GAS COMPANY LLC, a Virginia limited liability company, whose address is 1000 CONSOL Energy Drive, Suite 400, Canonsburg, Pennsylvania 15317 (hereinafter "Assignor") and TH EXPLORATION, LLC, a Texas limited liability company, whose address is 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (hereinafter "Assignee"). All references in this Assignment to "Party" or "Parties" shall be deemed at all times to mean Assignor or Assignee or both. Capitalized terms used but not defined herein shall have the meaning given such terms in the Acreage Trade Agreement, by and between Assignor and Assignee dated April 9, 2018 (the "ATA").

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 Exhibit A attached hereto INsofar AND ONLY INsofar as to the particular Target Formation(s) (defined below) described and delineated on Exhibit A 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")

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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   68.00

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 **CHEYRON 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.

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for now

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## ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "*Assignment*") is from SWN PRODUCTION COMPANY, LLC, 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 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 the Target Formations and 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*"). 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 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 Disclaimers of Warranties and Representations.**

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN SECTION VI 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 DESCRIPTIVE MEMORANDUM, OR ANY REPORT OF ANY OF ITS PETROLEUM

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April 30, 2018

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

RE: Keith Stern N-6HM

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-6HM 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-hilop.com](mailto:amiller@tug-hilop.com).

Sincerely,

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

Amy L. Miller  
Permitting Specialist – Appalachia Region

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

Date of Notice Certification: 08/03/2018

API No. 47- 051 -

Operator's Well No. Keith Stern N-6HM

Well Pad Name: Keith Stern

**Notice has been given:**

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

State: West Virginia  
 County: Marshall  
 District: Meade  
 Quadrangle: Glen Easton 7.5'  
 Watershed: Fish Creek (HUC 10)

UTM NAD 83 Easting: 526,373.29  
 Northing: 4,402,817.94  
 Public Road Access: Fish Creek Road (County Route 74)  
 Generally used farm name: TH Exploration, LLC

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

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

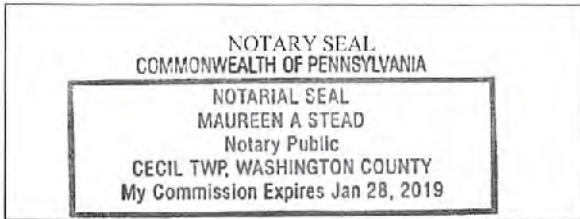
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication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



**Certification of Notice is hereby given:**

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>300 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>Amy Miller</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permitting Specialist - Appalachia Region</u>	Facsimile:	<u>724-338-2030</u>
Telephone:	<u>724-749-8388</u>	Email:	<u>amiller@tug-hillop.com</u>



Subscribed and sworn before me this 3 day of Aug. 2018.  
Maureen A Stead Notary Public  
 My Commission Expires 1/28/19

**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 [deprivacyofficer@wv.gov](mailto:deprivacyofficer@wv.gov).

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

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

**Date of Notice:** 8/2/2018 **Date Permit Application Filed:** 8/3/2018

**Notice of:**

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

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

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

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

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

SURFACE OWNER(s)  
Name: TH Exploration, LLC (Access Road and Well Pad)  
Address: 360 Southpointe Boulevard, Plaza II, Suite 200  
Canonsburg, PA 15318

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

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

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

SURFACE OWNER(s) (Impoundments or Pits)

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

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

COAL OPERATOR  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

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

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

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WW-6A  
(8-13)

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WV Department of  
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**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

**Well Location Restrictions**

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

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 57<sup>th</sup> St. SE  
Charleston, WV 25304  
(304) 926-0450

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

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

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

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API NO. 47- 051 -  
OPERATOR WELL NO. Keith Stern N-6HM  
Well Pad Name: Keith Stern

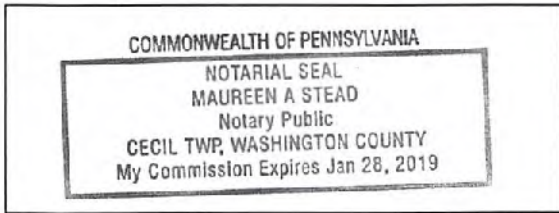
**Notice is hereby given by:**

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

Address: 380 Southpointe Boulevard, Plaza II, Suite 200  
Canonsburg, PA 15317  
Facsimile: 724-336-2030

**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](mailto:depprivacyofficer@wv.gov).

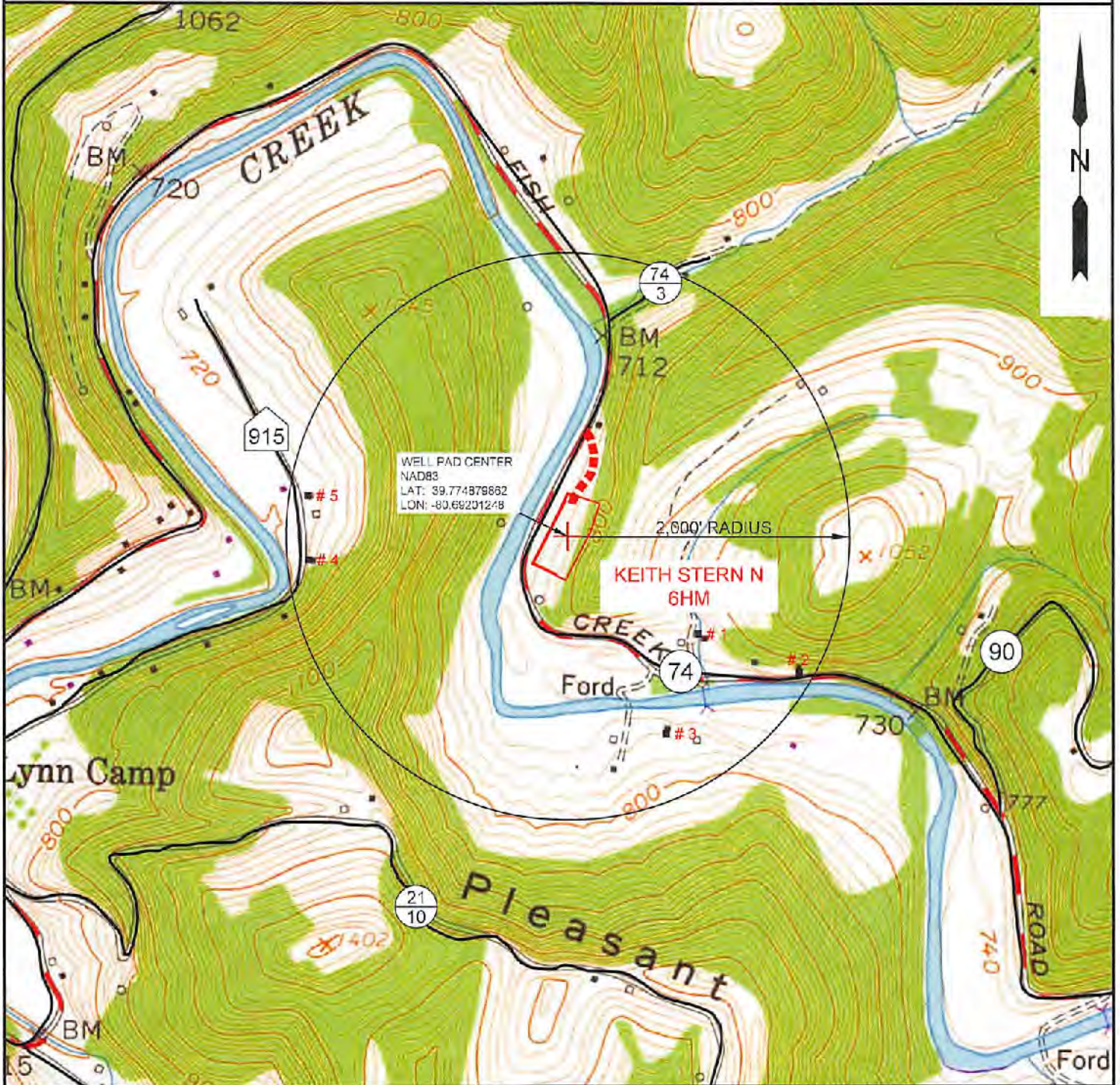


Subscribed and sworn before me this 2 day of Aug. 2018.  
Maureen A Stead Notary Public  
My Commission Expires 1/28/19

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WV Department of  
Environmental Protection

**PROPOSED  
KEITH STERN N - 6HM**

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

**SLS**  
Land & Energy Development  
Solutions from the ground up.  
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26031 • (304) 492-6534  
www.slsurveys.com

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

**TUG HILL  
OPERATING**

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

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

Well: KEITH STERN N – 6HM  
 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.

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

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

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

**Date of Notice:** 12/11/17 **Date of Planned Entry:** 12/13/17

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

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

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

**Notice is hereby provided to:**

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

COAL OWNER OR LESSEE  
**Name:** Consol Energy, Inc.  
**Address:** CNX Center, 1000 Consol Energy Drive  
 Canonsburg, PA 15317  
 MINERAL OWNER(s)  
**Name:** William K. and Betty L. Stern  
**Address:** 14912 Fish Creek Road  
 Glen Easton, WV 26039  
 \*please attach additional forms if necessary

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**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 57<sup>th</sup> 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](http://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
Telephone:	724-749-8388		Canonsburg, PA 15317
Email:	amiller@tug-hillcp.com	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](mailto:depprivacyofficer@wv.gov).

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

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

**Date of Notice:** 09/02/2018      **Date Permit Application Filed:** 08/03/2018

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

CERTIFIED MAIL       HAND  
RETURN RECEIPT REQUESTED      DELIVERY

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

**Notice is hereby provided to the SURFACE OWNER(s)**  
(at the address listed in the records of the sheriff at the time of notice):

Name: TH Exploration, LLC      Name: \_\_\_\_\_  
Address: 380 Southpointe Boulevard, Plaza II, Suite 200      Address: \_\_\_\_\_  
Cancnsburg, PA 15318

**Notice is hereby given:**

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

State: West Virginia      UTM NAD 83      Easting: 526,373.29  
County: Marshall      Northing: 4,402,817.94  
District: Meade      Public Road Access: Fish Creek Road (County Route 74)  
Quadrangle: Glen Easton 7.5'      Generally used farm name: TH Exploration, LLC  
Watershed: Fish Creek (HUC 10)

**This Notice Shall Include:**

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

Well Operator: Tug Hill Operating, LLC      Address: 380 Southpointe Boulevard, Plaza II, Suite 200  
Telephone: 724-749-8388      Cancnsburg, PA 15317  
Email: amiller@tug-hill-op.com      Facsimile: 724-333-2030

**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](mailto:depprivacyofficer@wv.gov).

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WV Department of  
Environmental Protection

**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-6A5
- (2) Application on Form WW-2(B) \_\_\_ / WW-3(B) \_\_\_ / WW-4(B) \_\_\_ / WW-5(B) \_\_\_ / WW-6(B) X
- (3) Plat showing the well location on Form WW-6, and
- (4) Construction and Reclamation Plan on Form WW-9

--all with respect to operator's Well No. Keith Stern N-6HM 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 3rd day of August, 2018 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 \_\_\_\_\_, a partner of the partnership or, because the partner refused to take it when I handed it over, by leaving it in the presence of the partner.

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:

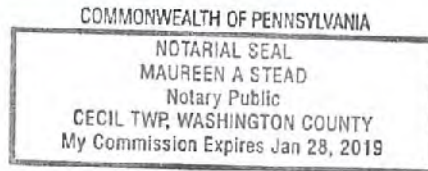
Handing it to the corporation's employee ✓ / officer \_\_\_ / director \_\_\_ / attorney in fact \_\_\_ / named David DeLallo.

Amy Muller  
(Signature of person executing service)

Taken, subscribed and sworn before me this 3 day of AUG. 2018.  
My commission expires 1/28/19

Maureen A Stead  
Notary Public

(AFFIX SEAL IF NOTARIZED OUTSIDE THE STATE)



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AUG 6 2018

WV Department of  
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

Thomas J. Smith, P. E.  
Secretary of Transportation/  
Commissioner of Highways

February 20, 2018

Jill M. Newman  
Deputy Commissioner

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

Subject: DOH Permit for the Keith Stern Pad, Marshall County

Keith Stern 1HM	Keith Stern 2HM	Keith Stern 3HM	Keith Stern 4HM
Keith Stern 5HM	Keith Stern 6HM ✓	Keith Stern 7HM	Keith Stern 8HM
Keith Stern 9HM	Keith Stern 10HM	Keith Stern 11HM	Keith Stern 12HM
Keith Stern 13HU	Keith Stern 14HU	Keith Stern 15HU	Keith Stern 16HU
Keith Stern 17HU	Keith Stern 18HU	Keith Stern 19HU	

Dear Mr. Martin,

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

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

Very Truly Yours,

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

Cc: Jonathan White  
Tug Hill Operating, LLC  
CH, OM, D-6  
File

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**PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION**

Well No. Keith Stern N-6HM

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

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