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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)

Friday, July 26, 2019  
WELL WORK PERMIT  
Horizontal 6A / New Drill


TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BLVD  
CANONSBURG, PA 15317

Re: Permit approval for MICHTER N-4HM  
47-051-02247-00-00

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: MICHTER N-4HM  
Farm Name: LARRY W. DUNLAP & CHARLES  
U.S. WELL NUMBER: 47-051-02247-00-00  
Horizontal 6A New Drill  
Date Issued: 7/26/2019

# 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

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

API Number: \_\_\_\_\_

## 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).

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

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

## Data Sources Reviewed:

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

Contacted Devin Ducoeur 724-705-0444, [dducoeur@dpslandservices.com](mailto:dducoeur@dpslandservices.com) DPS GIS (12/20/2018) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

## Request maps for:

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

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

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

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page 1 of 4



Permit well - Michter N-4HM

Wells within 500' Buffer

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

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705170216	Unknown	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	State records are incomplete

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Select County: (051) Marshall  
 Enter Perm# #: 70216  
 Select datatypes: (Check All)  
 Location  Production  Plugging  
 Owner/Completion  Stratigraphy  Sample  
 Pay/Show/Water  Logs  Blm Hole Loc

Get Data    Reset

- [Table Descriptions](#)
- [County Code Translations](#)
- [Permit Numbering Series](#)
- [Usage Notes](#)
- [Contact Information](#)
- [Disclaimer](#)
- [WVGES Main](#)
- [Pipeline-Plus](#) New

WV Geological & Economic Survey

Well: County = 51 Permit = 70216

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4705170216	Marshall	70216	Franklin	Powhatan Point	Clarington	39.618038	-80.607068	518510.7	4427576.4

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST
4705170216		Original Loc	Completed	A.G. Whitaker									

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD	G_BEF	G_AFT
4705170216								unclassified	unclassified	not available	unknown	unknown						

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

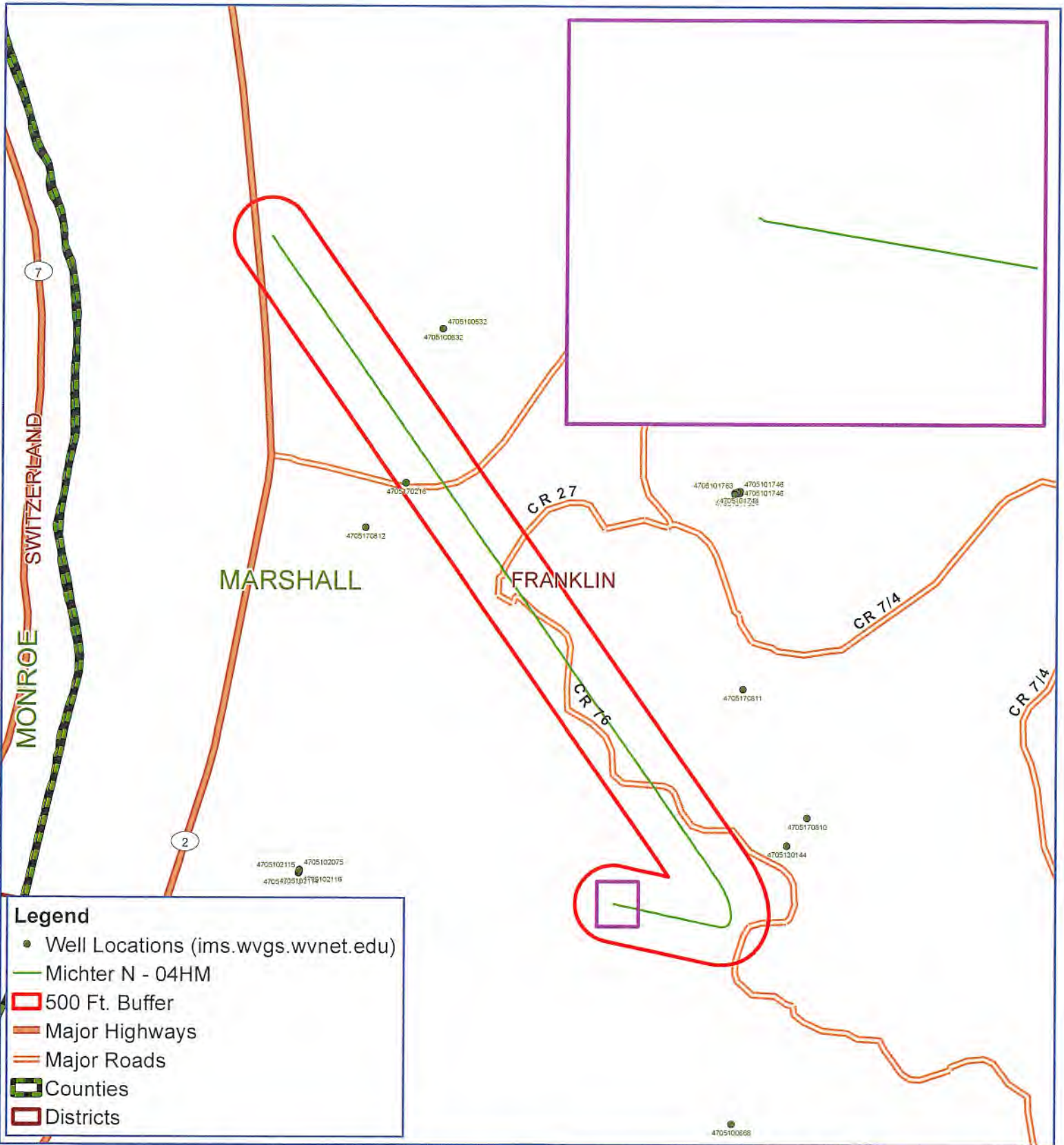
There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well

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# Michter N - 04HM Franklin District Marshall County, WV

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Prepared by:



Map Created: December 20, 2018  
Map Current As Of: December 20, 2018

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

WW-6B  
(04/15)

API NO. 47-051 \_\_\_\_\_  
OPERATOR WELL NO. Michter N-4HM  
Well Pad Name: Michter

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 Franklin New Martinsville 7  
Operator ID County District Quadrangle

2) Operator's Well Number: Michter N-4HM Well Pad Name: Michter

3) Farm Name/Surface Owner: Larry W. Dunlap & Charles Leroy Dunlap Public Road Access: Rines Ridge Road (County Route 76)

4) Elevation, current ground: 1,136.0' Elevation, proposed post-construction: 1,130.2'

5) Well Type (a) Gas X Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_

(b) If Gas Shallow x Deep \_\_\_\_\_  
Horizontal X

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 6267- 6321' thickness of 54' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,421'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 17,318'

11) Proposed Horizontal Leg Length: 10,228'

12) Approximate Fresh Water Strata Depths: 70', 700'

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

14) Approximate Saltwater Depths: 2,167'

15) Approximate Coal Seam Depths: Sewickly Coal - 596' and Pittsburgh Coal - 694'

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

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

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

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WW-6B  
(04/15)

4705102247  
API NO. 47-051  
OPERATOR WELL NO. Michter N-4HM  
Well Pad Name: Michter

18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259FT^3(CTS)
Fresh Water	13 3/8"	NEW	H40	48#	800'	800'	906ft^3(CTS)
Coal	13 3/8"	NEW	H40	48#	800'	800'	906ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,602'	2,602'	854ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	17,318'	17,318'	4416ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,242'	
Liners							

*Ju*  
*6/17/19*

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	13 3/8"	17 1/2"	.33	1,730	1,384	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	1,730	1,384	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE#24	1.19
Production	5 1/2"	8 7/8_ 8 3/4	.361	12,640	9,000	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

PACKERS

Kind:	N/A				<b>RECEIVED</b> Office of Oil and Gas <del>JUN 11 2019</del> WV Department of Environmental Protection Office of Oil and Gas
Sizes:	N/A				
Depths Set:	N/A				

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WW-6B  
(10/14)

4705102247

API NO. 47-051

OPERATOR WELL NO. Michter N-4HM

Well Pad Name: Michter

*JW*  
*1/7/19*

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

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

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

Well to be completed with approximately 25,570,000 lb proppant and 395,331 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 21.11 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.49 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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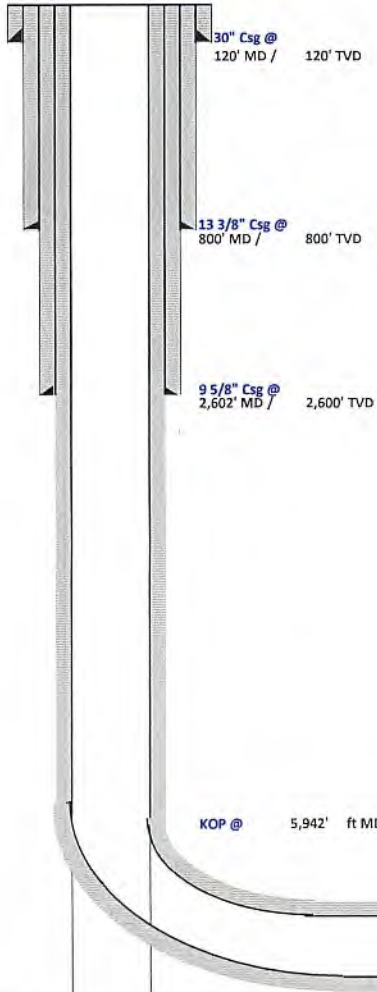
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\*Note: Attach additional sheets as needed.



WELL NAME: Michter N-4HM  
 STATE: WV COUNTY: Marshall  
 DISTRICT: Franklin  
 DF Elev: 1,130' GL Elev: 1,130'  
 TD: 17,318'  
 TH Latitude: 39.80293507  
 TH Longitude: -80.79736584  
 BH Latitude: 39.82688585  
 BH Longitude: -80.81337256



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	700
Sewickley Coal	596
Pittsburgh Coal	694
Big Lime	2034
Weir	2422
Berea	2548
Gordon	2771
Rhinestreet	5740
Geneseo/Burkett	6187
Tully	6206
Hamilton	6231
Marcellus	6267
Landing Depth	6303
Onondaga	6321
Pilot Hole Depth	6421

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	800'	800'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,602'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	17,318'	6,124'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	902	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	851	A	15	Air	1 Centralizer every other jt
Production	4,055	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

Pilot Hole PH TD @ 6,421' TVD  
 Landing Point @ 7,090' MD / 6,303' TVD  
 = 100' below Onondaga Top

Lateral TD @ 17,318' ft MD  
 6,124' ft TVD

*John*  
 12/27/18

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## Tug Hill Operating, LLC Casing and Cement Program

### Michter N-4HM

#### Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	800'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,602'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	17,318'	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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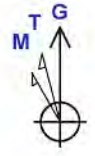
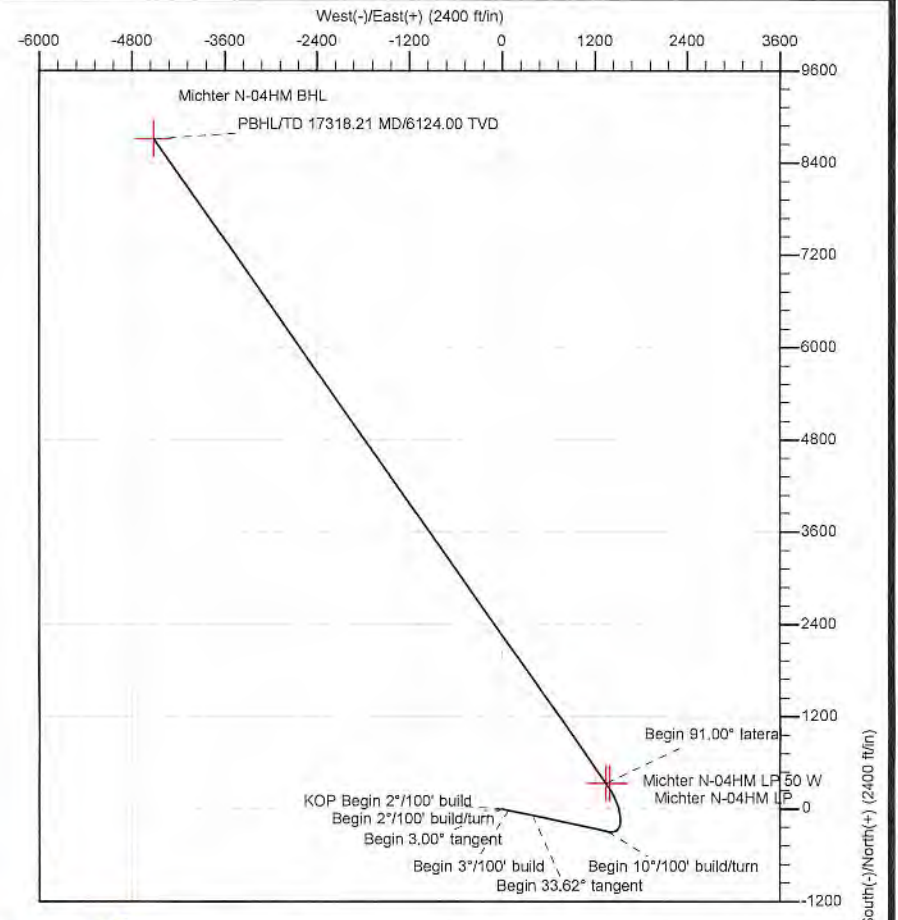
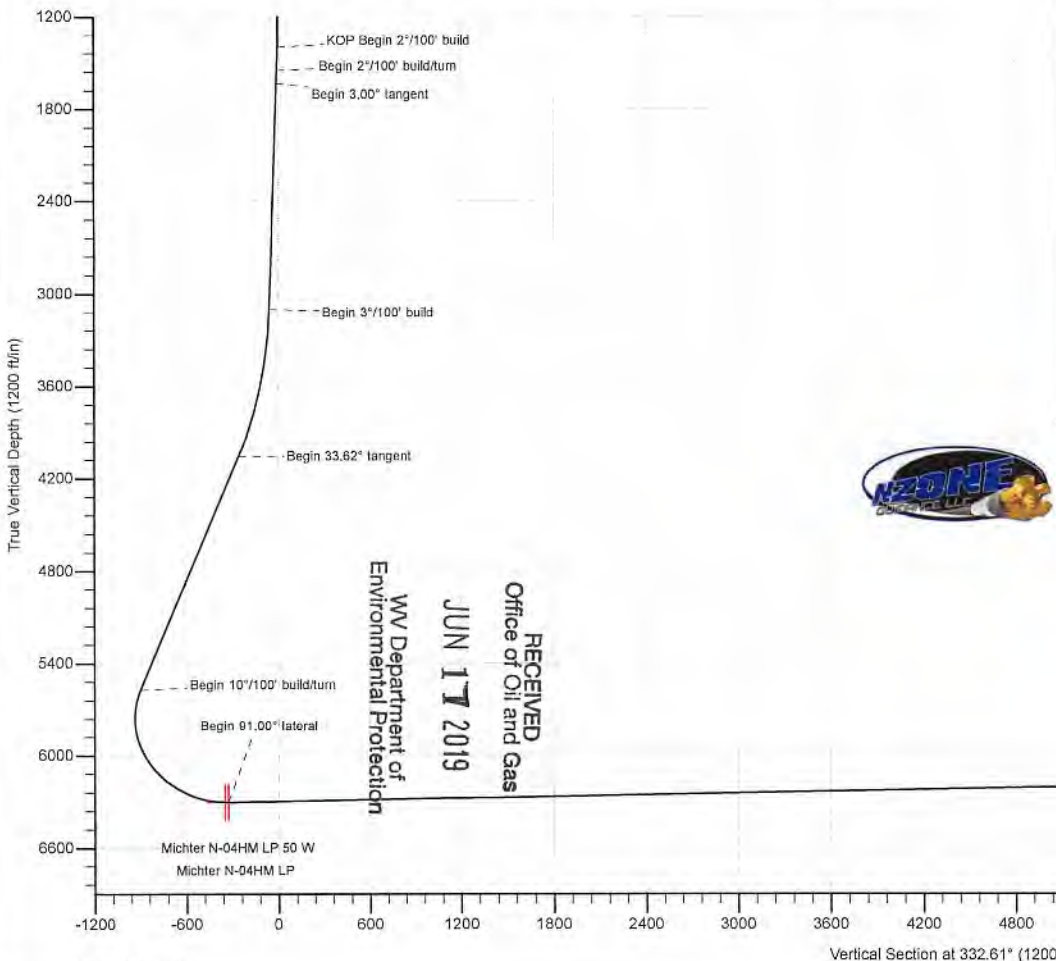




**Well: Michter N-04HM (B)**  
**Site: Michter**  
**Project: Marshall County, West Virginia.**  
**Design: rev1**

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1400.00	0.00	0.00	1400.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1550.00	3.00	135.00	1549.93	-2.78	2.78	2.00	135.00	-3.74	Begin 2°/100' build/turn
4	1634.87	3.00	102.12	1634.69	-4.81	6.52	2.00	-106.42	-7.27	Begin 3.00° tangent
5	3102.19	3.00	102.12	3100.00	-20.94	81.60	0.00	0.00	-56.13	Begin 3°/100' build
6	4122.96	33.62	102.12	4057.59	-87.47	391.44	3.00	0.00	-257.75	Begin 33.62° tangent
7	5941.76	33.62	102.12	5572.10	-298.92	1376.12	0.00	0.00	-898.50	Begin 10°/100' build/turn
8	7090.16	91.00	325.03	6303.00	331.43	1347.70	10.00	-131.40	-325.74	Begin 91.00° lateral
9	17318.21	91.00	325.03	6124.00	8711.42	-4513.76	0.00	0.00	9811.36	PBHL/TD 17318.21 MD/6124.00 TVD



Azimuths to Grid North:  
 True North: -0.  
 Magnetic North: -8.  
 Magnetic File Strength: 52088.9s  
 Dip Angle: 66.1  
 Date: 5/12/20  
 Model: IGRF20

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

System Datum: Mean Sea Level  
 Depth Reference: GL @ 1130.00ft

Northing: 14455039.82    Easting: 1697327.37    Latitude: 39.80293507    Longitude: -80.79736584

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.9°



Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Michter N-04HM (B)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1130.00ft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1130.00ft
<b>Site:</b>	Michter	<b>North Reference:</b>	Grid
<b>Well:</b>	Michter N-04HM (B)	<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>	Michter				
<b>Site Position:</b>		<b>Northing:</b>	14,454,962.42 usft	<b>Latitude:</b>	39.80272253
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,697,325.45 usft	<b>Longitude:</b>	-80.79737330
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.13 °

<b>Well</b>	Michter N-04HM (B)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	14,455,039.82 usft	<b>Latitude:</b>	39.80293507
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	1,697,327.37 usft	<b>Longitude:</b>	-80.79736584
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,130.00 ft

<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	5/12/2018	-8.66	66.91	52,088.93593911

<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) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	332.61	

<b>Plan Survey Tool Program</b>	<b>Date</b>	7/20/2018			
<b>Depth From (ft)</b>	<b>Depth To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>	
1	0.00	17,318.21 rev1 (Original Hole)	MWD		
			MWD - Standard		

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JUN 17 2019

<b>Plan Sections</b>											WV Department of Environmental Protection
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	<b>TFO (°)</b>	<b>Target</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00		
1,550.00	3.00	135.00	1,549.93	-2.78	2.78	2.00	2.00	0.00	135.00		
1,634.87	3.00	102.12	1,634.69	-4.81	6.52	2.00	0.00	-38.74	-106.42		
3,102.19	3.00	102.12	3,100.00	-20.94	81.60	0.00	0.00	0.00	0.00		
4,122.96	33.62	102.12	4,057.59	-87.47	391.44	3.00	3.00	0.00	0.00		
5,941.76	33.62	102.12	5,572.10	-298.92	1,376.12	0.00	0.00	0.00	0.00		
7,090.16	91.00	325.03	6,303.00	331.43	1,347.70	10.00	5.00	-11.94	-131.40	Michter N-04HM LP 5	
17,318.21	91.00	325.03	6,124.00	8,711.42	-4,513.76	0.00	0.00	0.00	0.00	Michter N-04HM BHL	





Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Michter N-04HM (B)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1130.00ft
Project:	Marshall County, West Virginia.	MD Reference:	GL @ 1130.00ft
Site:	Michter	North Reference:	Grid
Well:	Michter N-04HM (B)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
100.00	0.00	0.00	100.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
200.00	0.00	0.00	200.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
300.00	0.00	0.00	300.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
400.00	0.00	0.00	400.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
500.00	0.00	0.00	500.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
600.00	0.00	0.00	600.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
700.00	0.00	0.00	700.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
800.00	0.00	0.00	800.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
900.00	0.00	0.00	900.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,455,039.82	1,697,327.37	39.80293507	-80.79736584	
<b>KOP Begin 2°/100' build</b>										
1,500.00	2.00	135.00	1,499.98	-1.23	1.23	14,455,038.59	1,697,328.60	39.80293168	-80.79736146	
1,550.00	3.00	135.00	1,549.93	-2.78	2.78	14,455,037.04	1,697,330.14	39.80292743	-80.79735598	
<b>Begin 2°/100' build/turn</b>										
1,600.00	2.88	115.55	1,599.87	-4.24	4.84	14,455,035.58	1,697,332.20	39.80292339	-80.79734866	
1,634.87	3.00	102.12	1,634.69	-4.81	6.52	14,455,035.01	1,697,333.89	39.80292181	-80.79734267	
<b>Begin 3.00° tangent</b>										
1,700.00	3.00	102.12	1,699.73	-5.53	9.85	14,455,034.29	1,697,337.22	39.80291983	-80.79733081	
1,800.00	3.00	102.12	1,799.60	-6.63	14.97	14,455,033.19	1,697,342.34	39.80291678	-80.79731260	
1,900.00	3.00	102.12	1,899.46	-7.73	20.08	14,455,032.09	1,697,347.45	39.80291373	-80.79729439	
2,000.00	3.00	102.12	1,999.32	-8.83	25.20	14,455,030.99	1,697,352.57	39.80291068	-80.79727618	
2,100.00	3.00	102.12	2,099.18	-9.92	30.32	14,455,029.90	1,697,357.69	39.80290763	-80.79725797	
2,200.00	3.00	102.12	2,199.05	-11.02	35.44	14,455,028.80	1,697,362.80	39.80290458	-80.79723976	
2,300.00	3.00	102.12	2,298.91	-12.12	40.55	14,455,027.70	1,697,367.92	39.80290153	-80.79722155	
2,400.00	3.00	102.12	2,398.77	-13.22	45.67	14,455,026.60	1,697,373.04	39.80289848	-80.79720334	
2,500.00	3.00	102.12	2,498.64	-14.32	50.79	14,455,025.50	1,697,378.15	39.80289543	-80.79718513	
2,600.00	3.00	102.12	2,598.50	-15.42	55.90	14,455,024.40	1,697,383.27	39.80289238	-80.79716692	
2,700.00	3.00	102.12	2,698.36	-16.52	61.02	14,455,023.30	1,697,388.39	39.80288933	-80.79714871	
2,800.00	3.00	102.12	2,798.22	-17.62	66.14	14,455,022.20	1,697,393.51	39.80288628	-80.79713050	
2,900.00	3.00	102.12	2,898.09	-18.71	71.25	14,455,021.10	1,697,398.62	39.80288323	-80.79711229	
3,000.00	3.00	102.12	2,997.95	-19.81	76.37	14,455,020.01	1,697,403.74	39.80288018	-80.79709408	
3,100.00	3.00	102.12	3,097.81	-20.91	81.49	14,455,018.91	1,697,408.86	39.80287713	-80.79707587	
3,102.19	3.00	102.12	3,100.00	-20.94	81.60	14,455,018.88	1,697,408.97	39.80287707	-80.79707547	
<b>Begin 3°/100' build</b>										
3,200.00	5.93	102.12	3,197.50	-22.54	89.05	14,455,017.28	1,697,416.42	39.80287263	-80.79704897	
3,300.00	8.93	102.12	3,296.65	-25.25	101.70	14,455,014.57	1,697,429.06	39.80286509	-80.79700395	
3,400.00	11.93	102.12	3,394.99	-29.05	119.40	14,455,010.76	1,697,446.77	39.80285454	-80.79694094	
3,500.00	14.93	102.12	3,492.24	-33.93	142.11	14,455,005.89	1,697,469.48	39.80284100	-80.79686011	
3,600.00	17.93	102.12	3,588.14	-39.87	169.77	14,454,999.95	1,697,497.14	39.80282452	-80.79676168	
3,700.00	20.93	102.12	3,682.43	-46.86	202.30	14,454,992.96	1,697,529.67	39.80280513	-80.79664593	
3,800.00	23.93	102.12	3,774.85	-54.87	239.61	14,454,984.95	1,697,566.97	39.80278290	-80.79651316	
3,900.00	26.93	102.12	3,865.15	-63.88	281.59	14,454,975.94	1,697,608.96	39.80275788	-80.79636374	
4,000.00	29.93	102.12	3,953.08	-73.88	328.14	14,454,965.94	1,697,655.51	39.80273013	-80.79619808	
4,100.00	32.93	102.12	4,038.39	-84.83	379.12	14,454,954.99	1,697,706.49	39.80269975	-80.79601664	
4,122.96	33.62	102.12	4,057.59	-87.47	391.44	14,454,952.35	1,697,718.81	39.80269241	-80.79597280	
<b>Begin 33.62° tangent</b>										
4,200.00	33.62	102.12	4,121.74	-96.43	433.15	14,454,943.39	1,697,760.52	39.80266755	-80.79582438	
4,300.00	33.62	102.12	4,205.01	-108.06	487.29	14,454,931.76	1,697,814.66	39.80263528	-80.79563171	
4,400.00	33.62	102.12	4,288.28	-119.68	541.43	14,454,920.14	1,697,868.80	39.80260301	-80.79543904	

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COMPASS 5000.14 Build 85  
JUN 11 2019  
WV Department of Environmental Protection





Planning Report - Geographic

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia,  
 Site: Michter  
 Well: Michter N-04HM (B)  
 Wellbore: Original Hole  
 Design: rev1

Local Co-ordinate Reference: Well Michter N-04HM (B)  
 TVD Reference: GL @ 1130.00ft  
 MD Reference: GL @ 1130.00ft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,500.00	33.62	102.12	4,371.55	-131.31	595.57	14,454,908.51	1,697,922.93	39.80257075	-80.79524637
4,600.00	33.62	102.12	4,454.82	-142.93	649.71	14,454,896.89	1,697,977.07	39.80253848	-80.79505371
4,700.00	33.62	102.12	4,538.09	-154.56	703.84	14,454,885.26	1,698,031.21	39.80250621	-80.79486104
4,800.00	33.62	102.12	4,621.36	-166.18	757.98	14,454,873.63	1,698,085.35	39.80247394	-80.79466837
4,900.00	33.62	102.12	4,704.63	-177.81	812.12	14,454,862.01	1,698,139.49	39.80244167	-80.79447571
5,000.00	33.62	102.12	4,787.90	-189.44	866.26	14,454,850.38	1,698,193.63	39.80240940	-80.79428304
5,100.00	33.62	102.12	4,871.17	-201.06	920.40	14,454,838.76	1,698,247.76	39.80237713	-80.79409038
5,200.00	33.62	102.12	4,954.44	-212.69	974.54	14,454,827.13	1,698,301.90	39.80234486	-80.79389771
5,300.00	33.62	102.12	5,037.71	-224.31	1,028.68	14,454,815.51	1,698,356.04	39.80231259	-80.79370505
5,400.00	33.62	102.12	5,120.98	-235.94	1,082.81	14,454,803.88	1,698,410.18	39.80228032	-80.79351238
5,500.00	33.62	102.12	5,204.24	-247.57	1,136.95	14,454,792.25	1,698,464.32	39.80224805	-80.79331972
5,600.00	33.62	102.12	5,287.51	-259.19	1,191.09	14,454,780.63	1,698,518.46	39.80221578	-80.79312705
5,700.00	33.62	102.12	5,370.78	-270.82	1,245.23	14,454,769.00	1,698,572.60	39.80218351	-80.79293439
5,800.00	33.62	102.12	5,454.05	-282.44	1,299.37	14,454,757.38	1,698,626.73	39.80215124	-80.79274172
5,900.00	33.62	102.12	5,537.32	-294.07	1,353.51	14,454,745.75	1,698,680.87	39.80211897	-80.79254906
5,941.76	33.62	102.12	5,572.10	-298.92	1,376.12	14,454,740.90	1,698,703.48	39.80210549	-80.79246859
<b>Begin 10°/100' build/turn</b>									
6,000.00	30.05	93.38	5,621.59	-303.17	1,406.47	14,454,736.65	1,698,733.83	39.80209363	-80.79236058
6,100.00	25.71	73.99	5,710.15	-298.65	1,452.43	14,454,741.17	1,698,779.80	39.80210574	-80.79219688
6,200.00	24.63	50.47	5,800.88	-279.36	1,489.45	14,454,760.46	1,698,816.81	39.80215849	-80.79206493
6,300.00	27.19	28.21	5,891.03	-245.89	1,516.39	14,454,793.93	1,698,843.75	39.80225025	-80.79196873
6,400.00	32.55	11.16	5,977.87	-199.24	1,532.43	14,454,840.58	1,698,859.80	39.80237825	-80.79191121
6,500.00	39.58	359.01	6,058.76	-140.84	1,537.10	14,454,898.98	1,698,864.47	39.80253860	-80.79189411
6,600.00	47.54	350.19	6,131.23	-72.46	1,530.25	14,454,967.35	1,698,857.61	39.80272642	-80.79191795
6,700.00	56.02	343.41	6,193.09	3.81	1,512.08	14,455,043.63	1,698,839.44	39.80293601	-80.79198201
6,800.00	64.80	337.90	6,242.46	85.67	1,483.15	14,455,125.49	1,698,810.51	39.80316100	-80.79208434
6,900.00	73.75	333.13	6,277.83	170.62	1,444.33	14,455,210.44	1,698,771.70	39.80339455	-80.79222184
7,000.00	82.81	328.79	6,298.13	256.09	1,396.81	14,455,295.91	1,698,724.18	39.80362956	-80.79239032
7,090.16	91.00	325.03	6,303.00	331.43	1,347.70	14,455,371.25	1,698,675.07	39.80383679	-80.79256456
<b>Begin 91.00° lateral</b>									
7,100.00	91.00	325.03	6,302.83	339.49	1,342.07	14,455,379.31	1,698,669.43	39.80385897	-80.79258457
7,200.00	91.00	325.03	6,301.08	421.42	1,284.76	14,455,461.24	1,698,612.12	39.80408434	-80.79278794
7,300.00	91.00	325.03	6,299.33	503.36	1,227.45	14,455,543.17	1,698,554.82	39.80430970	-80.79299132
7,400.00	91.00	325.03	6,297.58	585.29	1,170.14	14,455,625.10	1,698,497.51	39.80453507	-80.79319470
7,500.00	91.00	325.03	6,295.83	667.22	1,112.83	14,455,707.04	1,698,440.20	39.80476044	-80.79339807
7,600.00	91.00	325.03	6,294.08	749.15	1,055.53	14,455,788.97	1,698,382.89	39.80498581	-80.79360145
7,700.00	91.00	325.03	6,292.33	831.08	998.22	14,455,870.90	1,698,325.58	39.80521118	-80.79380483
7,800.00	91.00	325.03	6,290.58	913.01	940.91	14,455,952.83	1,698,268.28	39.80543655	-80.79400821
7,900.00	91.00	325.03	6,288.83	994.94	883.60	14,456,034.76	1,698,210.97	39.80566191	-80.79421160
8,000.00	91.00	325.03	6,287.08	1,076.88	826.30	14,456,116.69	1,698,153.66	39.80588728	-80.79441498
8,100.00	91.00	325.03	6,285.33	1,158.81	768.99	14,456,198.62	1,698,096.35	39.80611265	-80.79461837
8,200.00	91.00	325.03	6,283.58	1,240.74	711.68	14,456,280.56	1,698,039.05	39.80633801	-80.79482175
8,300.00	91.00	325.03	6,281.83	1,322.67	654.37	14,456,362.49	1,697,981.74	39.80656338	-80.79502514
8,400.00	91.00	325.03	6,280.08	1,404.60	597.06	14,456,444.42	1,697,924.43	39.80678874	-80.79522853
8,500.00	91.00	325.03	6,278.33	1,486.53	539.76	14,456,526.35	1,697,867.12	39.80701411	-80.79543192
8,600.00	91.00	325.03	6,276.58	1,568.46	482.45	14,456,608.28	1,697,809.82	39.80723947	-80.79563531
8,700.00	91.00	325.03	6,274.83	1,650.40	425.14	14,456,690.21	1,697,752.51	39.80746484	-80.79583871
8,800.00	91.00	325.03	6,273.08	1,732.33	367.83	14,456,772.14	1,697,695.20	39.80769020	-80.79604210
8,900.00	91.00	325.03	6,271.33	1,814.26	310.53	14,456,854.07	1,697,637.89	39.80791557	-80.79624550
9,000.00	91.00	325.03	6,269.58	1,896.19	253.22	14,456,936.01	1,697,580.59	39.80814093	-80.79644889
9,100.00	91.00	325.03	6,267.83	1,978.12	195.91	14,457,017.94	1,697,523.28	39.80836629	-80.79665229
9,200.00	91.00	325.03	6,266.08	2,060.05	138.60	14,457,099.87	1,697,465.97	39.80859166	-80.79685569
9,300.00	91.00	325.03	6,264.33	2,141.98	81.29	14,457,181.80	1,697,408.66	39.80881702	-80.79705909
9,400.00	91.00	325.03	6,262.58	2,223.92	23.99	14,457,263.73	1,697,351.35	39.80904238	-80.79726250

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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Michter N-04HM (B)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1130.00ft
Project:	Marshall County, West Virginia.	MD Reference:	GL @ 1130.00ft
Site:	Michter	North Reference:	Grid
Well:	Michter N-04HM (B)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,500.00	91.00	325.03	6,260.83	2,305.85	-33.32	14,457,345.66	1,697,294.05	39.80926774	-80.79746590	
9,600.00	91.00	325.03	6,259.08	2,387.78	-90.63	14,457,427.59	1,697,236.74	39.80949310	-80.79766931	
9,700.00	91.00	325.03	6,257.33	2,469.71	-147.94	14,457,509.52	1,697,179.43	39.80971846	-80.79787271	
9,800.00	91.00	325.03	6,255.58	2,551.64	-205.24	14,457,591.46	1,697,122.12	39.80994382	-80.79807612	
9,900.00	91.00	325.03	6,253.83	2,633.57	-262.55	14,457,673.39	1,697,064.82	39.81016918	-80.79827953	
10,000.00	91.00	325.03	6,252.08	2,715.50	-319.86	14,457,755.32	1,697,007.51	39.81039454	-80.79848294	
10,100.00	91.00	325.03	6,250.33	2,797.44	-377.17	14,457,837.25	1,696,950.20	39.81061990	-80.79868635	
10,200.00	91.00	325.03	6,248.58	2,879.37	-434.48	14,457,919.18	1,696,892.89	39.81084526	-80.79888977	
10,300.00	91.00	325.03	6,246.83	2,961.30	-491.78	14,458,001.11	1,696,835.59	39.81107062	-80.79909318	
10,400.00	91.00	325.03	6,245.07	3,043.23	-549.09	14,458,083.04	1,696,778.28	39.81129598	-80.79929660	
10,500.00	91.00	325.03	6,243.32	3,125.16	-606.40	14,458,164.97	1,696,720.97	39.81152134	-80.79950001	
10,600.00	91.00	325.03	6,241.57	3,207.09	-663.71	14,458,246.91	1,696,663.66	39.81174669	-80.79970343	
10,700.00	91.00	325.03	6,239.82	3,289.02	-721.01	14,458,328.84	1,696,606.36	39.81197205	-80.79990685	
10,800.00	91.00	325.03	6,238.07	3,370.96	-778.32	14,458,410.77	1,696,549.05	39.81219741	-80.80011027	
10,900.00	91.00	325.03	6,236.32	3,452.89	-835.63	14,458,492.70	1,696,491.74	39.81242276	-80.80031370	
11,000.00	91.00	325.03	6,234.57	3,534.82	-892.94	14,458,574.63	1,696,434.43	39.81264812	-80.80051712	
11,100.00	91.00	325.03	6,232.82	3,616.75	-950.24	14,458,656.56	1,696,377.13	39.81287348	-80.80072055	
11,200.00	91.00	325.03	6,231.07	3,698.68	-1,007.55	14,458,738.49	1,696,319.82	39.81309883	-80.80092397	
11,300.00	91.00	325.03	6,229.32	3,780.61	-1,064.86	14,458,820.42	1,696,262.51	39.81332419	-80.80112740	
11,400.00	91.00	325.03	6,227.57	3,862.54	-1,122.17	14,458,902.36	1,696,205.20	39.81354954	-80.80133083	
11,500.00	91.00	325.03	6,225.82	3,944.48	-1,179.48	14,458,984.29	1,696,147.89	39.81377489	-80.80153426	
11,600.00	91.00	325.03	6,224.07	4,026.41	-1,236.78	14,459,066.22	1,696,090.59	39.81400025	-80.80173769	
11,700.00	91.00	325.03	6,222.32	4,108.34	-1,294.09	14,459,148.15	1,696,033.28	39.81422560	-80.80194113	
11,800.00	91.00	325.03	6,220.57	4,190.27	-1,351.40	14,459,230.08	1,695,975.97	39.81445096	-80.80214456	
11,900.00	91.00	325.03	6,218.82	4,272.20	-1,408.71	14,459,312.01	1,695,918.66	39.81467631	-80.80234800	
12,000.00	91.00	325.03	6,217.07	4,354.13	-1,466.01	14,459,393.94	1,695,861.36	39.81490166	-80.80255143	
12,100.00	91.00	325.03	6,215.32	4,436.06	-1,523.32	14,459,475.87	1,695,804.05	39.81512701	-80.80275487	
12,200.00	91.00	325.03	6,213.57	4,518.00	-1,580.63	14,459,557.81	1,695,746.74	39.81535236	-80.80295831	
12,300.00	91.00	325.03	6,211.82	4,599.93	-1,637.94	14,459,639.74	1,695,689.43	39.81557772	-80.80316175	
12,400.00	91.00	325.03	6,210.07	4,681.86	-1,695.25	14,459,721.67	1,695,632.13	39.81580307	-80.80336520	
12,500.00	91.00	325.03	6,208.32	4,763.79	-1,752.55	14,459,803.60	1,695,574.82	39.81602842	-80.80356864	
12,600.00	91.00	325.03	6,206.57	4,845.72	-1,809.86	14,459,885.53	1,695,517.51	39.81625377	-80.80377208	
12,700.00	91.00	325.03	6,204.82	4,927.65	-1,867.17	14,459,967.46	1,695,460.20	39.81647912	-80.80397553	
12,800.00	91.00	325.03	6,203.07	5,009.58	-1,924.48	14,460,049.39	1,695,402.90	39.81670447	-80.80417898	
12,900.00	91.00	325.03	6,201.32	5,091.52	-1,981.78	14,460,131.32	1,695,345.59	39.81692982	-80.80438243	
13,000.00	91.00	325.03	6,199.57	5,173.45	-2,039.09	14,460,213.26	1,695,288.28	39.81715517	-80.80458588	
13,100.00	91.00	325.03	6,197.82	5,255.38	-2,096.40	14,460,295.19	1,695,230.97	39.81738051	-80.80478933	
13,200.00	91.00	325.03	6,196.07	5,337.31	-2,153.71	14,460,377.12	1,695,173.66	39.81760586	-80.80499278	
13,300.00	91.00	325.03	6,194.32	5,419.24	-2,211.02	14,460,459.05	1,695,116.36	39.81783121	-80.80519624	
13,400.00	91.00	325.03	6,192.57	5,501.17	-2,268.32	14,460,540.98	1,695,059.05	39.81805656	-80.80539969	
13,500.00	91.00	325.03	6,190.82	5,583.10	-2,325.63	14,460,622.91	1,695,001.74	39.81828190	-80.80560315	
13,600.00	91.00	325.03	6,189.07	5,665.04	-2,382.94	14,460,704.84	1,694,944.43	39.81850725	-80.80580661	
13,700.00	91.00	325.03	6,187.32	5,746.97	-2,440.25	14,460,786.77	1,694,887.13	39.81873260	-80.80601007	
13,800.00	91.00	325.03	6,185.57	5,828.90	-2,497.55	14,460,868.71	1,694,829.82	39.81895794	-80.80621353	
13,900.00	91.00	325.03	6,183.82	5,910.83	-2,554.86	14,460,950.64	1,694,772.51	39.81918329	-80.80641699	
14,000.00	91.00	325.03	6,182.07	5,992.76	-2,612.17	14,461,032.57	1,694,715.20	39.81940863	-80.80662046	
14,100.00	91.00	325.03	6,180.32	6,074.69	-2,669.48	14,461,114.50	1,694,657.90	39.81963398	-80.80682392	
14,200.00	91.00	325.03	6,178.57	6,156.62	-2,726.78	14,461,196.43	1,694,600.59	39.81985932	-80.80702739	
14,300.00	91.00	325.03	6,176.82	6,238.56	-2,784.09	14,461,278.36	1,694,543.28	39.82008467	-80.80723086	
14,400.00	91.00	325.03	6,175.07	6,320.49	-2,841.40	14,461,360.29	1,694,485.97	39.82031001	-80.80743432	
14,500.00	91.00	325.03	6,173.32	6,402.42	-2,898.71	14,461,442.23	1,694,428.67	39.82053535	-80.80763779	
14,600.00	91.00	325.03	6,171.57	6,484.35	-2,956.02	14,461,524.16	1,694,371.36	39.82076070	-80.80784127	
14,700.00	91.00	325.03	6,169.82	6,566.28	-3,013.32	14,461,606.09	1,694,314.05	39.82098604	-80.80804474	
14,800.00	91.00	325.03	6,168.07	6,648.21	-3,070.63	14,461,688.02	1,694,256.74	39.82121138	-80.80824821	
14,900.00	91.00	325.03	6,166.32	6,730.14	-3,127.94	14,461,769.95	1,694,199.44	39.82143672	-80.80845169	

JUN 11 2019





Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Michter N-04HM (B)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1130.00ft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1130.00ft
<b>Site:</b>	Michter	<b>North Reference:</b>	Grid
<b>Well:</b>	Michter N-04HM (B)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,000.00	91.00	325.03	6,164.57	6,812.08	-3,185.25	14,461,851.88	1,694,142.13	39.82166207	-80.80865517	
15,100.00	91.00	325.03	6,162.82	6,894.01	-3,242.55	14,461,933.81	1,694,084.82	39.82188741	-80.80885864	
15,200.00	91.00	325.03	6,161.07	6,975.94	-3,299.86	14,462,015.74	1,694,027.51	39.82211275	-80.80906212	
15,300.00	91.00	325.03	6,159.32	7,057.87	-3,357.17	14,462,097.68	1,693,970.20	39.82233809	-80.80926561	
15,400.00	91.00	325.03	6,157.57	7,139.80	-3,414.48	14,462,179.61	1,693,912.90	39.82256343	-80.80946909	
15,500.00	91.00	325.03	6,155.82	7,221.73	-3,471.79	14,462,261.54	1,693,855.59	39.82278877	-80.80967257	
15,600.00	91.00	325.03	6,154.07	7,303.66	-3,529.09	14,462,343.47	1,693,798.28	39.82301411	-80.80987606	
15,700.00	91.00	325.03	6,152.32	7,385.60	-3,586.40	14,462,425.40	1,693,740.97	39.82323945	-80.81007954	
15,800.00	91.00	325.03	6,150.57	7,467.53	-3,643.71	14,462,507.33	1,693,683.67	39.82346478	-80.81028303	
15,900.00	91.00	325.03	6,148.82	7,549.46	-3,701.02	14,462,589.26	1,693,626.36	39.82369012	-80.81048652	
16,000.00	91.00	325.03	6,147.07	7,631.39	-3,758.32	14,462,671.19	1,693,569.05	39.82391546	-80.81069001	
16,100.00	91.00	325.03	6,145.32	7,713.32	-3,815.63	14,462,753.13	1,693,511.74	39.82414080	-80.81089350	
16,200.00	91.00	325.03	6,143.57	7,795.25	-3,872.94	14,462,835.06	1,693,454.44	39.82436614	-80.81109699	
16,300.00	91.00	325.03	6,141.82	7,877.18	-3,930.25	14,462,916.99	1,693,397.13	39.82459147	-80.81130049	
16,400.00	91.00	325.03	6,140.07	7,959.12	-3,987.56	14,462,998.92	1,693,339.82	39.82481681	-80.81150398	
16,500.00	91.00	325.03	6,138.32	8,041.05	-4,044.86	14,463,080.85	1,693,282.51	39.82504215	-80.81170748	
16,600.00	91.00	325.03	6,136.57	8,122.98	-4,102.17	14,463,162.78	1,693,225.21	39.82526748	-80.81191098	
16,700.00	91.00	325.03	6,134.82	8,204.91	-4,159.48	14,463,244.71	1,693,167.90	39.82549282	-80.81211448	
16,800.00	91.00	325.03	6,133.07	8,286.84	-4,216.79	14,463,326.64	1,693,110.59	39.82571815	-80.81231798	
16,900.00	91.00	325.03	6,131.32	8,368.77	-4,274.09	14,463,408.58	1,693,053.28	39.82594349	-80.81252148	
17,000.00	91.00	325.03	6,129.57	8,450.70	-4,331.40	14,463,490.51	1,692,995.97	39.82616882	-80.81272499	
17,100.00	91.00	325.03	6,127.82	8,532.64	-4,388.71	14,463,572.44	1,692,938.67	39.82639415	-80.81292849	
17,200.00	91.00	325.03	6,126.07	8,614.57	-4,446.02	14,463,654.37	1,692,881.36	39.82661949	-80.81313200	
17,300.00	91.00	325.03	6,124.32	8,696.50	-4,503.32	14,463,736.30	1,692,824.05	39.82684482	-80.81333550	
17,318.21	91.00	325.03	6,124.00	8,711.42	-4,513.76	14,463,751.22	1,692,813.62	39.82688585	-80.81337256	

PBHL/TD 17318.21 MD/6124.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Michter N-04HM BHL - hit/miss target - Shape - Point	0.00	0.00	6,124.00	8,711.42	-4,513.76	14,463,751.22	1,692,813.62	39.82688585	-80.81337256	
Michter N-04HM LP - plan misses target center by 41.27ft at 7062.87ft MD (6302.89 TVD, 308.92 N, 1363.12 E) - Point	0.00	0.01	6,303.00	331.43	1,397.70	14,455,371.25	1,698,725.07	39.80383647	-80.79238653	
Michter N-04HM LP 50 \\ - plan hits target center - Point	0.00	0.00	6,303.00	331.43	1,347.70	14,455,371.25	1,698,675.07	39.80383679	-80.79256456	

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Michter N-04HM (B)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1130.00ft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1130.00ft
<b>Site:</b>	Michter	<b>North Reference:</b>	Grid
<b>Well:</b>	Michter N-04HM (B)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,400.00	1,400.00	0.00	0.00	KOP Begin 2°/100' build
1,550.00	1,549.93	-2.78	2.78	Begin 2°/100' build/turn
1,634.87	1,634.69	-4.81	6.52	Begin 3.00° tangent
3,102.19	3,100.00	-20.94	81.60	Begin 3°/100' build
4,122.96	4,057.59	-87.47	391.44	Begin 33.62° tangent
5,941.76	5,572.10	-298.92	1,376.12	Begin 10°/100' build/turn
7,090.16	6,303.00	331.43	1,347.70	Begin 91.00° lateral
17,318.21	6,124.00	8,711.42	-4,513.76	PBHL/TD 17318.21 MD/6124.00 TVD

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WW-9  
(4/16)

API Number 47 - 051 - \_\_\_\_\_  
Operator's Well No. Michter N-4HM

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

**FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN**

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) Fish Creek Quadrangle New Martinsville 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 / WV0109189) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1386426)

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 [Signature]  
Company Official (Typed Name) Jim Pancake  
Company Official Title VP Geosciences

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Subscribed and sworn before me this 20 day of DECEMBER, 20 2018  
Maureen A Stead Notary Public

WV Department of Environmental Protection  
Environmental Protection

My commission expires 4/28/19

COMMONWEALTH OF PENNSYLVANIA  
NOTARIAL SEAL  
MAUREEN A STEAD  
Notary Public  
CECIL TWP, WASHINGTON COUNTY  
My Commission Expires Jan 28, 2019



Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 21.11 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
Annual Ryegrass	40
Spring Oats	96

Seed Type	lbs/acre
Orchard Grass	12
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: 12/27/18

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Field Reviewed? (  ) Yes (  ) No

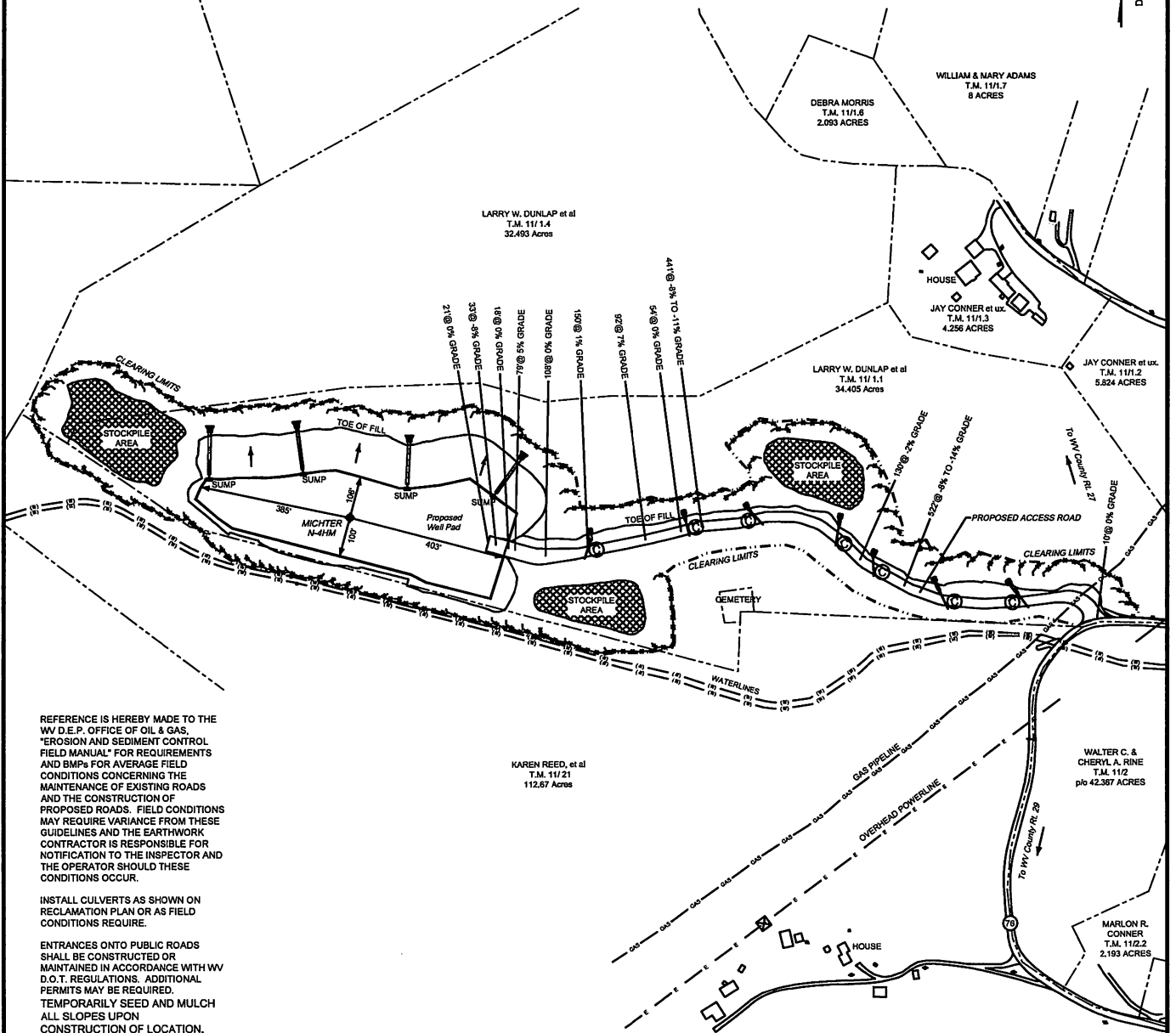
WV Department of  
Environmental Protection

WW-9

PROPOSED MICHTER  
N-4HM

SUPPLEMENT PG 1

DRAWING NOT  
TO SCALE



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.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED. TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

LEGEND

- Note:
- ⊙ — Denotes proposed culvert with appropriate sediment outlet control (Rip Rap splash pad).
  - Silt Fence and or Sediment and Erosion Control Measure.
  - Surface Boundary

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*12/27/18*

# Well Site Safety Plan

## Tug Hill Operating, LLC

Well Name: Michter N-4HM

Pad Location: Michter Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,405,904.95

Easting: 517,346.42

December 2018

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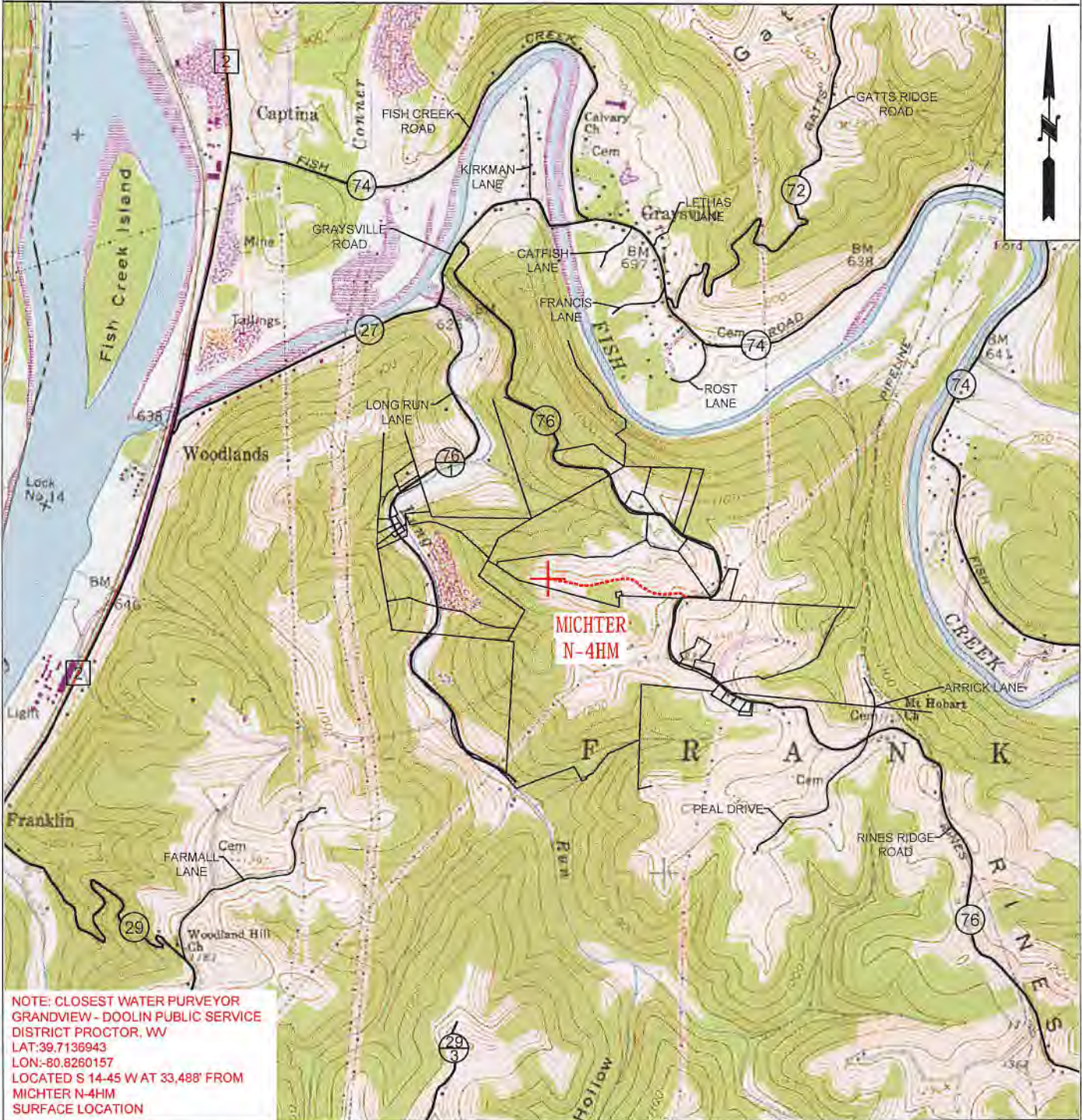
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WW-9

# PROPOSED MICHTER N-4HM

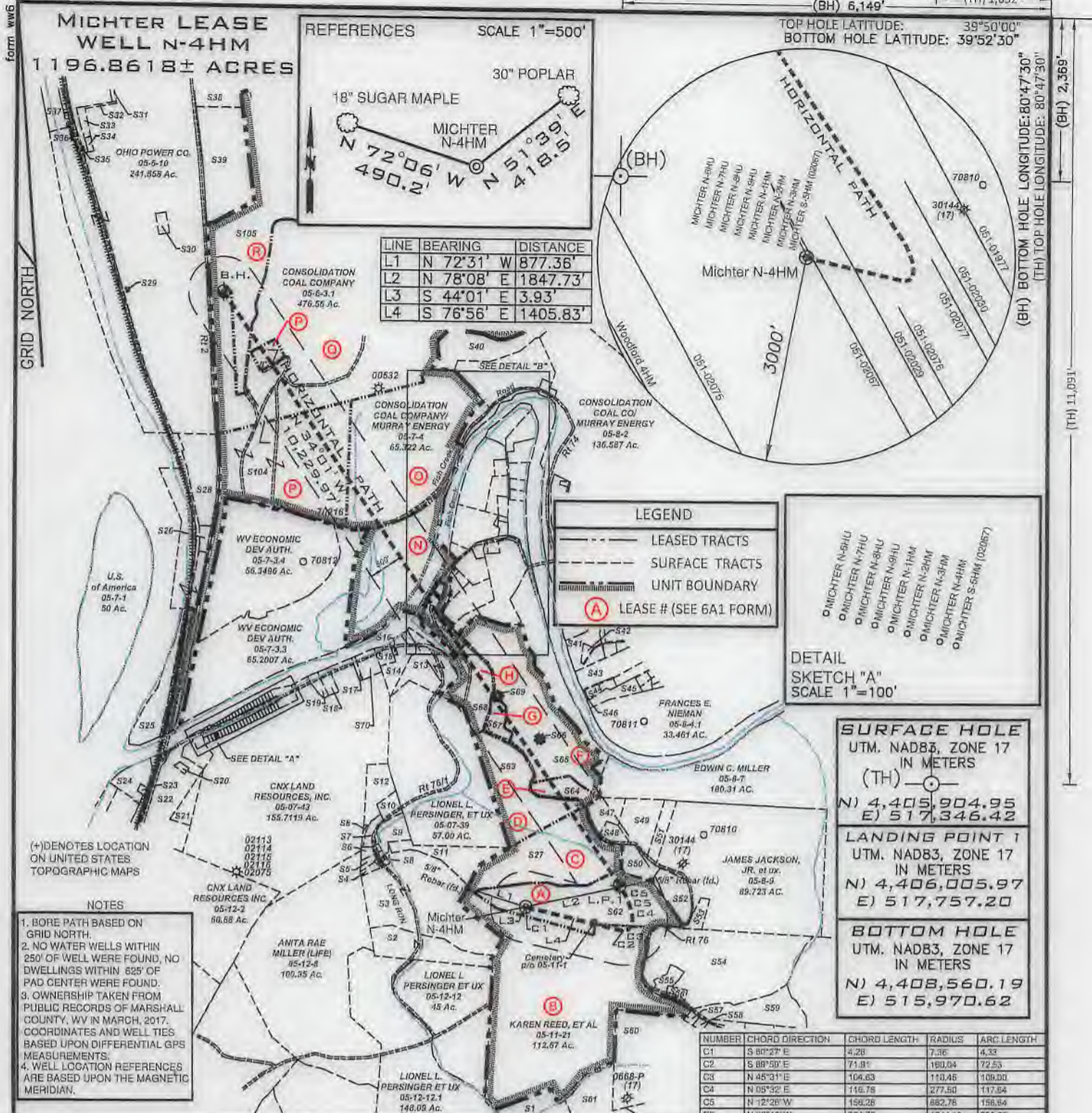
SUPPLEMENT PG 2



NOTE: CLOSEST WATER PURVEYOR  
GRANDVIEW - DOOLIN PUBLIC SERVICE  
DISTRICT PROCTOR, WV  
LAT: 39.7136943  
LON: -80.8260157  
LOCATED S 14.45 W AT 33,488' FROM  
MICHTER N-4HM  
SURFACE LOCATION

 <b>TUG HILL OPERATING</b>	<b>OPERATOR</b>	494510851	<b>TOPO SECTION</b>	<b>LEASE NAME</b>
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	MICHTER
			<b>SCALE:</b> 1" = 2000'	<b>DATE:</b> RECEIVED Office of DATE: 12-19-2018 JUN 11





**NOTES**  
 (+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

- BORE PATH BASED ON GRID NORTH.
- NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 825' OF PAD CENTER WERE FOUND.
- OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
- WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

**SURFACE HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
(TH)  $\odot$   
N) 4,405,904.95  
E) 517,346.42

**LANDING POINT 1**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,406,005.97  
E) 517,757.20

**BOTTOM HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,408,560.19  
E) 515,970.62

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	S 80°27' E	4.28	7.36	4.33
C2	S 88°50' E	71.91	180.04	72.53
C3	N 45°31' E	104.63	110.46	109.00
C4	N 05°32' E	116.78	277.50	117.84
C5	N 72°28' W	158.28	882.76	158.84
C6	N 28°48' W	324.72	1244.18	325.65

FILE NUMBER \_\_\_\_\_

DRAWING NUMBER MICHTER\_N-4HM\_REV1

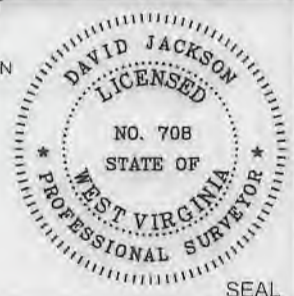
SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING  
GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 708  
*David L Jackson*



JACKSON SURVEYING INC.  
 P.O. Box 1460  
 Clarksburg, WV 26302  
 304-623-5851

WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET, SE  
 CHARLESTON, WV 25304

DATE: JANUARY 04, 2019

OPERATORS WELL NO. MICHTER N-4HM

API WELL NO. 47-051-02247 HGA

STATE COUNTY PERMIT

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

LOCATION ELEVATION 1130.2' WATERSHED (HUC 10) FISH CREEK

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER SEE WW-6A1 FORM

SURFACE OWNER LARRY W. DUNLAP & CHARLES LEROY DUNLAP ACREAGE 34.405

OIL & GAS ROYALTY OWNER LARRY W. DUNLAP & CHARLES LEROY DUNLAP LEASE ACREAGE 34.405

PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION \_\_\_  
 PERFORATE NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6,421' TMD: 17,318'

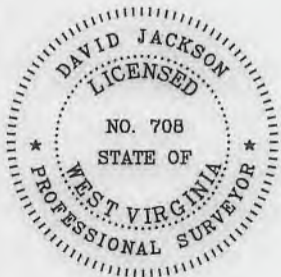
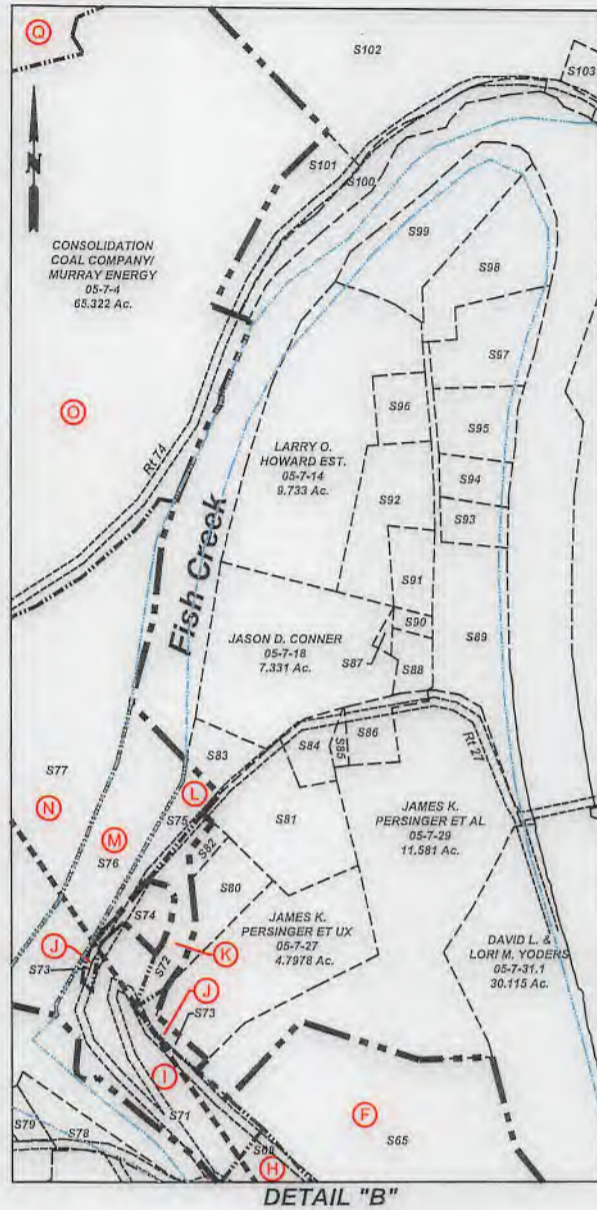
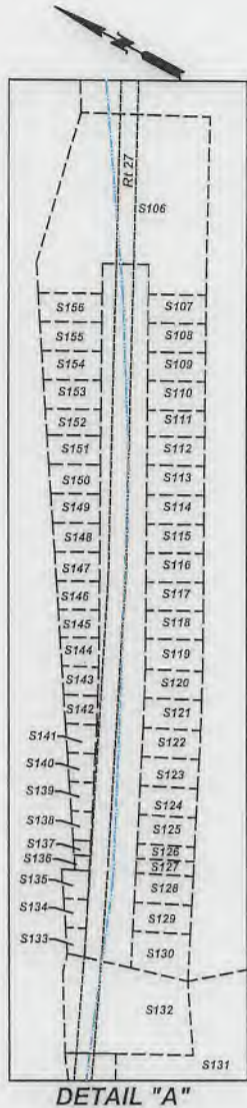
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER  
CT CORPORATION SYSTEM

ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD  
FORT WORTH, TX 76107 CHARLESTON, WV 25313

COUNTY NAME  
 PERMIT



PG 2 OF 3  
**MICHTER LEASE**  
**WELL N-4HM**  
 1196.8618± ACRES



P.S. 708 *David L Jackson*



**TUG HILL**  
**OPERATING**

OPERATOR'S  
 WELL #: Michter N-4HM  
 DISTRICT: Franklin  
 COUNTY: Marshall  
 STATE: WV

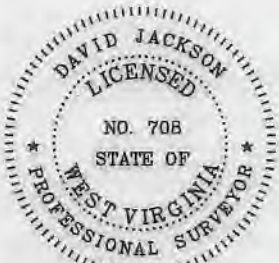
WELL PLAT  
 PAGE 2 OF 3  
 DATE: 01/04/2019



PG 3 OF 3 MICTHER LEASE  
WELL N-4HM  
1196.8618± ACRES

Number	TAX MAP - PARCEL	ADJOINER OWNER	ACRES
S1	05-12-11	Wesley Bryan & Wesley Bryan II	52.478
S2	05-12-10	Consolidation Coal Company/ Murray Energy c/o Land Dept	13.76
S3	05-12-10.1	Consolidation Coal Company/ Murray Energy	38.48
S4	05-07-42.4	Jason Reed Hartley	0.94
S5	05-07-42.3	Joshua David Hartley	0.886
S6	05-07-42.2	Steven & Rhonda Lloyd	0.85
S7	05-07-44	Crystal B. Darrah	1.726
S8	05-07-42	Tracy M. Kesterson	0.54
S9	05-07-42.5	Matthew V. Conner, et al	3.791
S10	05-07-41	James A. Wade	1.00
S11	05-12-09	Lionel & Mary Lee Persinger	10.15
S12	05-07-42.1	Lionel L. & Mary Lee Persinger	5.99
S13	05-07-35	Samuel L. Persinger	10.708
S14	05-07-36	John Persinger	4.329
S15	05-07-38	John K. Persinger, et ux	2.65
S16	05-07-37	John K. Persinger, et ux	0.133
S17	05-07-43.3	M. Frank Mason	0.327
S18	05-78-48	Cassidy Rain Carpenter	1.325
S19	05-78-49	Cassidy Rain Carpenter	1.1441
S20	05-07-43.4	Ida L. Campbell	0.403
S21	05-07-43.1	WV DOH	1.48
S22		State Road Commission	17.62 Cole
S23	05-7A-32	Dawn Thompson Tennant	0.3091
S24	05-7A-31	WV Dept. of Natural Resources	3.18
S25	05-07-03	Consolidation Coal Company/ Murray Energy	12.2641
S26	05-07-3.5	Wheeling Power Company	1.5004
S27 C	05-11-1.4	Larry Dunlap, et al	32.493
S28	05-06-3.1	Ohio Power Co.	28.9966
S29	05-06-16	Appalachian Power CP	0.61
S30	05-06-11	Consolidation Coal Company/ Murray Energy	1.05
S31	05-06-14	CII Carbon, LLC	1.408
S32	05-06-13	CII Carbon, LLC	0.318
S33	05-06-09	CII Carbon, LLC	1.15
S34	05-06-12	CII Carbon, LLC	0.43458
S35	05-06-18	CII Carbon, LLC	0.2754
S36	05-06-1.2	Ohio Power Co.	0.693
S37	05-06-1.1	CII Carbon, LLC	13.269
S38	05-06-06	Consolidation Coal Company/ Murray Energy	18.50
S39	05-06-05	Consolidation Coal Company/ Murray Energy	17.159
S40	05-06-04	Consolidation Coal Company/ Murray Energy	5.47
S41	05-8A-39	Barbara L. Daniels & Elaine Wills	3.223
S42	05-8A-40	Barbara L. Daniels & Elaine Wills	0.627
S43	05-8A-42	Robert M. White	7.23
S44	05-8A-46	Barbara L. Rose & Mary L. Rose	1.5
S45	05-8A-47	Barbara L. Rose & Mary L. Rose	3.0
S46	05-8A-45	Raymond A. Jr. & Larriette Scott	0.305
S47	05-11-01	William N. & Virginia A. Roupe	4.527
S48	05-11-1.6	Debra Morris	2.093
S49	05-11-1.7	William S. & Mary K. Adams	8.00
S50	05-11-1.3	Jay A. Conner, et ux	4.256
S51	05-11-1.5	Paul & Sandy Witt	3.507
S52	05-11-1.2	Jay A. Conner, et ux	5.824
S53	05-08-9.1	Scott E. Jackson, Tammy S. South & Marion Jackson	1.957
S54	05-11-02	Walter C. & Cheryl A. Rine	42.36
S55	05-11-2.2	Joshua A. Myers	2.193
S56	05-11-2.1	Walter C. & Cheryl A. Rine	1.19
S57	05-11-20	David E. Gray	0.569
S58	05-11-19	David E. Gray	0.532
S59	05-11-03	Kevin R. Corley, et ux	13.18
S60	05-11-17	Kevin R. Corley, et ux	36.13
S61	05-11-14	Hiram's Estate Family, LTD LLP	158.054
S62 A	05-11-1.1	Larry W. Dunlap & Charles Leroy Dunlap	34.405
S63 D	05-07-33	William N. Roupe	24.60
S64 E	05-07-32	William N. & Virginia A. Roupe	4.2

Number	TAX MAP - PARCEL	ADJOINER OWNER	ACRES
S65 F	05-07-31	William N. Roupe, et ux	43.147
S66	05-07-31.4	Grandview-Doolen PSD	0.23
S67 G	05-07-31.2	William N. Roupe, et ux	3.304
S68 H	05-07-34	WV DOH	10.88
S69	05-07-31.3	William N. & Virginia A. Roupe	0.230
S70	05-07-43.2	M. Frank Mason	1.36
S71 I	05-07-26	James A. Wade	7.80
S72 K	05-07-23.1	WV DOH	2.37
S73 J	05-07-25	WV DOH	0.50
S74	05-07-24	James A. Wade	0.578
S75 L	05-07-45	Robert L. Henry (Life) & Jeffrey S. Henry	0.65
S76 M	Fish Creek	State of WV	4.92 Calc.
S77 N	05-07-3.2	Ohio Power Company	45.5348
S78	05-07-35.1	Lionel L. & Marylee Persinger	0.812
S79	05-07-36.1	Lionel L. & Mary Lee Persinger	0.5579
S80	05-07-23	Arlie L. Powell	1.435
S81	05-07-27.1	Mark L. Ritter, et ux	3.427
S82	05-07-23.2	Robert L. Henry (Life) & Jeffrey S. Henry	0.256
S83	05-07-21	Aaron S. Meyer	1.775
S84	05-07-22	Jesus & Mary Bustamante	0.782
S85	05-07-28.1	Jesus & Mary Bustamante	0.200
S86	05-07-28	Thelma M. Roupe	0.940
S87	05-07-18.1	Debra L. Bennett	0.13
S88	05-07-17	Debra L. Bennett	0.614
S89	05-07-15	William Roupe, et ux	6.631
S90	05-07-16	Debra L. Bennett	0.235
S91	05-07-14.2	Robert L. Eyles, Sr. & Jessica L. Bennett	0.998
S92	05-07-14.3	Steven H. Howard	2.669
S93	05-07-15.1	Woodland Hills Recreation Club	1.016
S94	05-07-13	Woodland Hills Recreation Club	1.109
S95	05-07-12	Carol A. & Shelva G. Smith	2.01
S96	05-07-14.1	Larry O. Howard, Est.	1.00
S97	05-07-11	Roy S. & Cynthia M. Meadows	2.90
S98	05-07-10.1	Sandra Kay Beymer & Chad M. Wright	4.237
S99	05-07-10	Darren Edward Thacker	4.737
S100	05-07-5.1	George A. Knuth	2.95
S101	05-07-05	CNX Gas Company, LLC	1.407
S102	05-07-06	CNX Gas Company, LLC	21.171
S103	05-07-07	Consolidation Coal Company/ Murray Energy	1.00
S104 P	05-07-02	Consolidation Coal Company/ Murray Energy	46.46
S105 R	05-06-03	Ohio Power Co.	281.046
S106	05-7B-01	Patricia L. Robinson	1.257
S107	05-7B-47	Daniel D. Robinson, et ux	0.1148
S108	05-7B-46	Daniel D. Robinson, et ux	0.1148
S109	05-7B-45	Daniel D. & Mary E. Robinson	0.1148
S110	05-7B-44	Daniel D. & Mary E. Robinson	0.1148
S111	05-7B-43	Teresa & Thomas Gouldsberry	0.1148
S112	05-7B-42	Teresa & Thomas Gouldsberry	0.1194
S113	05-7B-41	Teresa & Thomas Gouldsberry	0.1148
S114	05-7B-40	Teresa & Thomas Gouldsberry	0.1148
S115	05-7B-39	Teresa & Thomas Gouldsberry	0.1148
S116	05-7B-38	Teresa & Thomas Gouldsberry	0.1148
S117	05-7B-37	Teresa & Thomas Gouldsberry	0.1148
S118	05-7B-36	Albert J. Anderson, Jr.	0.1148
S119	05-7B-35	Albert J. Anderson, Jr.	0.1217
S120	05-7B-34	Albert J. Anderson, Jr.	0.1148
S121	05-7B-33	Albert J. Anderson, Jr.	0.1182
S122	05-7B-32	Albert J. Anderson, Jr.	0.1148
S123	05-7B-31	Cindy D. Aliff, et al	0.1148
S124	05-7B-30	Cindy D. Aliff, et al	0.1148
S125	05-7B-29	Cindy D. Aliff	0.1148
S126	05-7B-28.1	Cindy D. Aliff	0.0574
S127	05-7B-28	Cindy D. Aliff	0.0574
S128	05-7B-27	Patricia A. Johnson	0.1148
S129	05-7B-26	Cindy D. Aliff	0.1148
S130	05-7B-25	Cindy D. Aliff	0.1673
S131	05-7A-02	CNX Land Resources, Inc.	2.23
S132	05-7A-01	Lucille Myers	0.529
S133	05-7B-24	Cindy D. Aliff	0.0354
S134	05-7B-23	Cindy D. Aliff	0.0471
S135	05-7B-22	Cindy D. Aliff	0.0505
S136	05-7B-21	Cindy D. Aliff	0.0287
S137	05-7B-21.1	Cindy D. Aliff	0.0296
S138	05-7B-20	Cindy D. Aliff	0.0626
S139	05-7B-19	Cindy D. Aliff	0.0712
S140	05-7B-18	Cindy D. Aliff	0.0763
S141	05-7B-17	Albert J. Anderson, Jr.	0.0849
S142	05-7B-16	Albert J. Anderson, Jr.	0.0903
S143	05-7B-15	Albert J. Anderson, Jr.	0.0970
S144	05-7B-14	Albert J. Anderson, Jr.	0.0991
S145	05-7B-13	Albert J. Anderson, Jr.	0.1067
S146	05-7B-12	Teresa & Thomas Gouldsberry	0.1113
S147	05-7B-11	Teresa & Thomas Gouldsberry	0.1159
S148	05-7B-10	Teresa & Thomas Gouldsberry	0.1199
S149	05-7B-09	Teresa & Thomas Gouldsberry	0.1240
S150	05-7B-08	Teresa & Thomas Gouldsberry	0.1286
S151	05-7B-07	Teresa & Thomas Gouldsberry	0.1331
S152	05-7B-06	Teresa & Thomas Gouldsberry	0.1377
S153	05-7B-05	Daniel D. & Mary E. Robinson	0.1418
S154	05-7B-04	Daniel D. & Mary E. Robinson	0.1458
S155	05-7B-03	Daniel D. Robinson, et ux	0.1504
S156	05-7B-02	Daniel D. Robinson, et ux	0.1550



P.S. 708 *David L Jackson*



**TUG HILL**  
OPERATING

OPERATOR'S  
WELL #: Michter N-4HM  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV

WELL PLAT  
PAGE 3 OF 3  
DATE: 01/04/2019



WW-6A1  
(5/13)

Operator's Well No. Michter N-4HM

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

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

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

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

\*See attached pages

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

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

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

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Office of Oil and Gas  
JUN 17 2019

WV Department of  
Environmental Protection

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 ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*47051.089.0	5-11-1.1	A	LARRY W DUNLAP AND BARBARA E DUNLAP ET AL	TH EXPLORATION LLC	1/8+	864 148	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22780	5-11-21	B	BRENDA FAYE THOMAS PETRACK	NOBLE ENERGY INC	1/8+	850 161	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22777	5-11-21	B	BOYD BUESKING	NOBLE ENERGY INC	1/8+	850 159	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22810	5-11-21	B	CLYDE V. & KAREN S REED	NOBLE ENERGY INC	1/8+	864 190	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22667	5-11-21	B	REBEKAH DRAYER ELDRIDGE AND CHRISTOPHER ELDRIDGE	NOBLE ENERGY INC	1/8+	850 157	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22773	5-11-21	B	CHRISTA DRAYER STALEY AND JOSHUA STALEY	NOBLE ENERGY INC	1/8+	851 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22786	5-11-21	B	GUY YATES	NOBLE ENERGY INC	1/8+	848 206	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22787	5-11-21	B	GAIL ANN YATES WOOD AND WESLEY J WOOD	NOBLE ENERGY INC	1/8+	848 208	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22788	5-11-21	B	GENIE SUE THOMAS HOLMES AND JOHN L HOLMES	NOBLE ENERGY INC	1/8+	848 204	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22801	5-11-21	B	BOYD DAIL YATES JR AND MARLA YATES	NOBLE ENERGY INC	1/8+	848 210	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22808	5-11-21	B	SHIRLEY YATES HARTSELL AND FREDDIE LEE HARTSELL	NOBLE ENERGY INC	1/8+	848 212	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.089.0	5-11-1.4	C	LARRY W DUNLAP AND BARBARA E DUNLAP ET AL	TH EXPLORATION LLC	1/8+	864 148	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22751	5-7-33	D	WILLIAM N ROUPE AND VIRGINIA A ROUPE	TH EXPLORATION LLC	1/8+	977 367	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648012	5-7-33	D	BLACK GOLD GROUP, LTD.	NOBLE ENERGY INC	1/8+	850 155	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648010	5-7-33	D	CHAD L. OLIVER, A SINGLE MAN	NOBLE ENERGY INC	1/8+	849 649	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648006	5-7-33	D	CRISTI LANAGHAN AND MARTIN LANAGHAN, WIFE AND HUSBAND	NOBLE ENERGY INC	1/8+	846 327	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648015	5-7-33	D	DEVIN J. OLIVER, A SINGLE MAN	NOBLE ENERGY INC	1/8+	851 426	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648003	5-7-33	D	JAMES N. OLIVER, A SINGLE MAN	NOBLE ENERGY INC	1/8+	842 502	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648007	5-7-33	D	JANET MILLER AND JAMES A. MILLER, WIFE AND HUSBAND	NOBLE ENERGY INC	1/8+	846 325	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648008	5-7-33	D	JOAN KIDD AND ROBERT KIDD, WIFE AND HUSBAND	NOBLE ENERGY INC	1/8+	846 329	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q074648005	5-7-33	D	JOHN E. OLIVER AND GAIL S. OLIVER, HUSBAND AND WIFE	NOBLE ENERGY INC	1/8+	842 498	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Office of Oil and Gas

JUN 17 2019

WV Department of  
Environmental Protection

Q074648009	5-7-33	D	KENNETH E. OLIVER AND RHONDA OLIVER, HUSBAND AND WIFE	NOBLE ENERGY INC	1/8+	846	323	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	HG Energy II Appalachia to TH Exploration LLC: 41/398
Q074648011	5-7-33	D	LAWRENCE K. OLIVER, II AND PHYLLIS K. OLIVER, HUSBAND AND WIFE	NOBLE ENERGY INC	1/8+	849	645	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	HG Energy II Appalachia to TH Exploration LLC: 41/398
Q074648002	5-7-33	D	LOIS J. LAND AND CECIL H. LAND, WIFE AND HUSBAND	NOBLE ENERGY INC	1/8+	842	500	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	HG Energy II Appalachia to TH Exploration LLC: 41/398
Q074648013	5-7-33	D	NICHOLAS A. OLIVER AND STEPHANIE OLIVER, HUSBAND AND WIFE	NOBLE ENERGY INC	1/8+	850	153	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	HG Energy II Appalachia to TH Exploration LLC: 41/398
Q074648004	5-7-33	D	PEGGIANN E. MOSHER AND ROWAN MOSHER, WIFE AND HUSBAND	NOBLE ENERGY INC	1/8+	842	508	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	HG Energy II Appalachia to TH Exploration LLC: 41/398
TH19175	5-7-32	E	WILLIAM N ROUPE AND VIRGINIA A ROUPE	TRIENERGY HOLDINGS LLC	1/8+	711	503	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
10*22751	5-7-31	F	WILLIAM N ROUPE AND VIRGINIA A ROUPE	TH EXPLORATION LLC	1/8+	977	367	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22751	5-7-31.2	G	WILLIAM N ROUPE AND VIRGINIA A ROUPE	TH EXPLORATION LLC	1/8+	977	367	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q075434001	5-7-34	H	JAMES E ROBINSON AND CAMILLA L ROBINSON	NOBLE ENERGY INC	1/8+	795	188	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q075434002	5-7-34	H	THOMAS L ROBINSON	NOBLE ENERGY INC	1/8+	795	190	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q075434003	5-7-34	H	PATRICIA A ANKROM	NOBLE ENERGY INC	1/8+	795	184	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q075434004	5-7-34	H	JOHN S ROBINSON AND SHERRIE J ROBINSON	NOBLE ENERGY INC	1/8+	795	186	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q075434005	5-7-34	H	ELIZABETH J STEWART	NOBLE ENERGY INC	1/8+	796	132	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083734000	5-7-26	I	JAMES A WADE SR	TRIENERGY HOLDINGS LLC	1/8+	707	371	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q091664000	5-7-25	J	JOSEPH H JACKSON JR AND CAROLYN JACKSON	NOBLE ENERGY INC	1/8+	860	526	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q091953000	5-7-23.1	K	PATRICIA Y DARRAH	NOBLE ENERGY INC	1/8+	860	552	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q097423000	5-7-45	L	ROBERT L HENRY JR AND GEORGEANNA HENRY ET AL	NOBLE ENERGY INC	1/8+	890	613	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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Q091960000	Fish Creek - State of WV	M	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	NOBLE ENERGY INC	1/8+	865	558	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083442000	5-7-3.2	N	AEP GENERATION RESOURCES INC ET AL	NOBLE ENERGY INC	1/8+	829	157	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624083	5-7-4	O	GATTS, LLOYD Q & MARY WOLFE	THE M. A. HANNA COMPANY	1/8+	290	94	The M. A. Hanna Company to Pittsburgh Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624074	5-7-2	P	GATTS, ALICE	THE M. A. HANNA COMPANY	1/8+	282	394	The M. A. Hanna Company to Pittsburgh Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011007	5-6-3.1	Q	SUSAN WITTEN NEAL MYERS ET AL	NOBLE ENERGY INC	1/8+	815	375	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011008	5-6-3.1	Q	JANE WITTEN VOTH	NOBLE ENERGY INC	1/8+	853	306	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011003	5-6-3.1	Q	JOSEPH MOORE NEAL	NOBLE ENERGY INC	1/8+	859	512	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011006	5-6-3.1	Q	FRANCES GALE NEAL	NOBLE ENERGY INC	1/8+	851	218	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011005	5-6-3.1	Q	ANN ALEXANDER	NOBLE ENERGY INC	1/8+	853	310	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011013	5-6-3.1	Q	MARY WITTEN NEAL WISEMAN	NOBLE ENERGY INC	1/8+	851	216	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624074	5-6-3.1	Q	GATTS, ALICE	THE M. A. HANNA COMPANY	1/8+	282	394	The M. A. Hanna Company to Pittsburgh Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624080	5-6-3.1	Q	GATTS, ELIZABETH R J & HARLEY	THE M. A. HANNA COMPANY	1/8+	290	97	The M. A. Hanna Company to Pittsburgh Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624083	5-6-3.1	Q	GATTS, LLOYD Q & MARY WOLFE	THE M. A. HANNA COMPANY	1/8+	290	94	The M. A. Hanna Company to Pittsburgh Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624150	5-6-3.1	Q	RINE, G W & BESSIE J	PITTSBURGH CONSOLIDATION COAL COMPANY	1/8+	313	200	N/A	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624074	5-6-3	R	GATTS, ALICE	THE M. A. HANNA COMPANY	1/8+	282	394	The M. A. Hanna Company to Pittsburgh Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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624080	5-6-3	R	GATTS, ELIZABETH R J & HARLEY	THE M. A. HANNA COMPANY	1/8+	290	97	The M. A. Hanna Company to Pittsburgh Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
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624150	5-6-3	R	RINE, G W & BESSIE J	PITTSBURGH CONSOLIDATION COAL COMPANY	1/8+	313	200	N/A	Name Change: Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 6/203	Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Consolidation Coal Company, CNX Land Resources Inc, Et Al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011007	5-6-3	R	SUSAN WITTEN NEAL MYERS ET AL	NOBLE ENERGY INC	1/8+	815	375	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011008	5-6-3	R	JANE WITTEN VOTH	NOBLE ENERGY INC	1/8+	853	306	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011003	5-6-3	R	JOSEPH MOORE NEAL	NOBLE ENERGY INC	1/8+	859	512	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011006	5-6-3	R	FRANCES GALE NEAL	NOBLE ENERGY INC	1/8+	851	218	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011005	5-6-3	R	ANN ALEXANDER	NOBLE ENERGY INC	1/8+	853	310	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074011013	5-6-3	R	MARY WITTEN NEAL WISEMAN	NOBLE ENERGY INC	1/8+	851	216	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/381	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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MEMORANDUM OF OPERATING AGREEMENT AND FINANCING STATEMENT

This Memorandum of Operating Agreement and Financing Statement (hereinafter referred to as "Memorandum") is executed to be effective concurrently with that certain Operating Agreement (the "Operating Agreement") by and between TH Exploration, LLC, as Operator, and HG Energy II Appalachia, LLC and TH Exploration II, LLC, as Non-Operators, covering, among other things, the development and production of crude oil, natural gas and associated substances from the leases (hereinafter called the "Contract Area") described on Exhibit "A-1" and Exhibit "A-2" attached hereto and owned by Operator and Non-Operator in the respective percentages of shares indicated on Exhibit "A" to the Operating Agreement.

The Operating Agreement contains an Accounting Procedure, along with provisions giving the parties hereto mutual liens and security interests where one or more parties hereto are or may become Debtors to one or more other parties hereto. This Memorandum incorporates by reference all of the terms and conditions of the Operating Agreement, including but not limited to the lien and security interest provisions.

The purpose of this Memorandum is to place third parties on notice of the Operating Agreement, and to secure and perfect the mutual liens and security interests of the parties hereto.

The Operating Agreement specifically provides and the parties do hereby confirm and agree that:

1. The Operator shall conduct and direct and have full control of all operations on the Contract Area as permitted and required by, and within the limits of, the Operating Agreement.
2. The liability of the parties under the Operating Agreement shall be several, not joint or collective. Each party shall be responsible only for its obligations and shall be liable only for its proportionate share of costs.
3. Each Non-Operator grants to Operator a lien upon its oil and gas rights, oil and gas leases and mineral interests in the Contract Area, and a security interest in its share of oil and/or gas when extracted and its interest in all fixtures, inventory, personal property and equipment located on or used on the Contract Area and in all its contract rights and receivables related thereto and arising therefrom to secure payment of its present and future share of costs and expenses, together with interest thereon at the rate provided in the Accounting Procedure referred to above. To the extent that Operator has a security interest under the Uniform Commercial Code ("Code") of the state or states in which the Contract Area is located, Operator without prejudice and in addition to all other legal, equitable and contractual remedies which are expressly reserved, shall be entitled to exercise the rights and remedies of a secured party under the Code. The bringing of a suit and the obtaining of judgment by Operator for the secured indebtedness shall not be deemed an election of remedies or otherwise affect the rights or security interests for the payment thereof.
4. The Operator grants to Non-Operator a lien and security interest equivalent to that granted to Operator as described in Paragraph 3 above, to secure payment by Operator of its own share of costs and expenses when due.

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January 4, 2019

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

RE: Michter N-4HM

Subject: Marshall County Route 27 and 74 Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 27 and 74 in the area reflected on the Michter N-4HM well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

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 Miller".

Amy Miller  
Permit Specialist – Appalachia Region  
Cell 304-376-0111  
Email: [amiller@tug-hilop.com](mailto:amiller@tug-hilop.com)

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

Date of Notice Certification: 01/04/2019

API No. 47- 051 \_\_\_\_\_  
Operator's Well No. Michter N-4HM  
Well Pad Name: Michter

**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:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>517,904.95</u>
County:	<u>Marshall</u>		Northing:	<u>4,405,904.95</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Rines Ridge Road (County Route 76)</u>	
Quadrangle:	<u>Powhatan Point 7.5'</u>	Generally used farm name:	<u>Larry W. Dunlap and Charles Leroy Dunlap</u>	
Watershed:	<u>Fish Creek</u>			

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.

<p>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:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><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</p> <p style="padding-left: 40px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p align="center"><b>OOG OFFICE USE ONLY</b></p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p>
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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.

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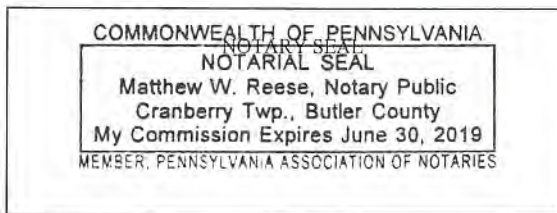


WW-6AC  
(1/12)

**Certification of Notice is hereby given:**

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>Amy L. 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 4 day of January 2019  
*[Signature]* Notary Public  
My Commission Expires 6-30-2019

**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

WW-6A  
(9-13)

API NO. 47- 051 -  
OPERATOR WELL NO. Michter N-4HM  
Well Pad Name: Michter

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: 12/28/2018 Date Permit Application Filed: 12/28/2018

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: Larry W. and Barbara E. Dunlap (Pad and Access Road)  
Address: 1549 Irish Ridge Road  
Cameron, WV 26033

Name: Karen Sue Reed and Clyde Reed (Well Pad)  
Address: 100 Orchard Lane  
Moundsville, WV 26041

SURFACE OWNER(s) (Road and/or Other Disturbance)  
Name: Charles Leroy Dunlap (Pad and Access Road)  
Address: 21 Gypsy Drive  
Moundsville, WV 26041

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

SURFACE OWNER(s) (Impoundments or Pits)  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

COAL OWNER OR LESSEE  
Name: CNX Resources, LLC - Attn: Casey Saunders  
Address: 1000 CONSOL Energy Drive  
Canonsburg, PA 15318

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

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

OPERATOR OF ANY NATURAL GAS STORAGE FIELD  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

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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/and-gas/pages/default.aspx](http://www.dep.wv.gov/and-gas/pages/default.aspx).

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**Well Location Restrictions**

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

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

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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WW-6A  
(8-13)

API NO. 47- 051 -  
OPERATOR WELL NO. Michter N-4HM  
Well Pad Name: Michter

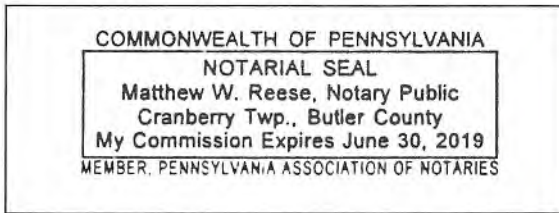
**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 28 day of Dec., 2018.

*[Signature]*

Notary Public

My Commission Expires June 30, 2019

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WV Department of  
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Tug Hill Operating, LLC  
380 Southpointe BLVD, Suite 200  
Canonsburg, PA 15317

**WATER WELL REPORT**

Well: MICHTER N-4HM  
District: Franklin  
County: Marshall  
State: WV

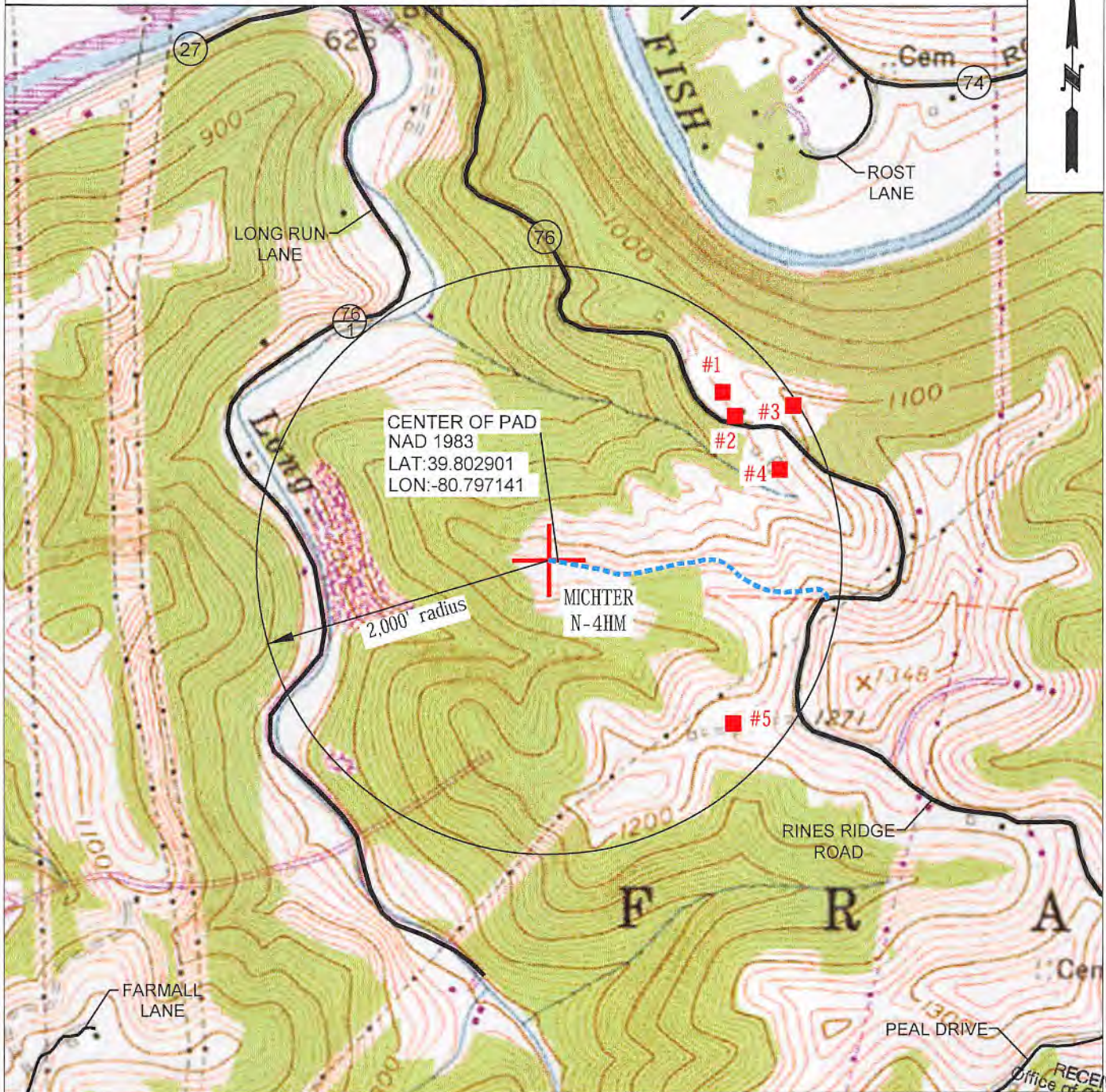
There appears to be Five ( 5 ) possible water sources within 2,000 feet of the above referenced well location.

Topo Spot # 1 TM 11 Par. 1.6 Debra Morris 304-810-0813 1082 Rines Ridge Rd. Proctor, WV 26055	Topo Spot # 2 TM 11 Par. 1.6 Debra Morris 304-810-0813 1082 Rines Ridge Rd. Proctor, WV 26055	Topo Spot # 3 TM 11 Par. 1.7 William S. & Mary K. Adams 330-718-0404 P.O. Box 303 Canfield, OH 44406
Topo Spot # 4 TM 11 Par. 1.3 Jay A. Conner, et ux 304-845-0641 1117 Rine Ridge Rd. Proctor, WV 26055	Topo Spot # 5 TM 11 Par. 21 Karen Reed, et al 304-845-7536 100 Orchard Ln. Moundsville, WV 26041	

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# PROPOSED MICHTER N-4HM

*There appears to be Five ( 5 ) possible water sources within 2,000'.*



**OPERATOR** 494510851  
 TUG HILL OPERATING, LLC  
 380 SOUTHPOINTE BLVD  
 SUITE 200  
 CANONSBURG, PA 15317

**TOPO SECTION**  
 POWHATAN POINT 7.5'  
**SCALE:**  
 1" = 1000'

**LEASE NAME** JUN 11 2019  
 MICHTER  
**DATE:**  
 DATE: 12-19-2018

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WW-6A3  
(1/12)Operator Well No. Michter N-4HM

**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:** 5/6/2018      **Date of Planned Entry:** 5/15/2018

**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: Larry W. and Barbara E. Dunlap (Pad and Access Road)  
Address: 1549 Irish Ridge Road  
Cameron, WV 26033

Name: Charles Leroy Dunlap (Pad and Access Road)  
Address: 2500 Ohio St. Lot # 10  
Moundsville, WV 26041

Name: Karen Sue Reed and Clyde Reed (Well Pad)  
Address: RR 4 Box 237  
Moundsville, WV 26041

COAL OWNER OR LESSEE

Name: CNX Land Resources, LLC Attn: Casey Saunders  
Address: 1000 CONSOL Energy Drive  
Canonsburg, PA 15317

MINERAL OWNER(s)

Name: Larry W. and Barbara E. Dunlap (see attached list)  
Address: 1549 Irish Ridge Road  
Cameron, WV 26033  
\*please attach additional forms if necessary

**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State:	<u>West Virginia</u>	Approx. Latitude & Longitude:	<u>39.8027785; -80.7973528</u>
County:	<u>Marshall</u>	Public Road Access:	<u>Rines Ridge Road (County Route 76)</u>
District:	<u>Franklin</u>	Watershed:	<u>Fish Creek (HUC 10)</u>
Quadrangle:	<u>Powhatan Point 7.5'</u>	Generally used farm name:	<u>Larry Dunlap, et al</u>

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:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
Telephone:	<u>724-749-8388</u>		<u>Canonsburg, PA 15317</u>
Email:	<u>amiller@tug-hilltop.com</u>	Facsimile:	<u>724-338-2030</u>

**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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**WW-6A3 NOTICE OF ENTRY FOR PLAT SURVEY  
ATTACHMENT #1  
WELL: MICTER N-4HM**

Mineral Owners (Well Pad)

Charles Leroy Dunlap /  
2500 Ohio Street, Lot #10  
Moundsville, WV 26041

Boyd Dail Yates, Jr. /  
909 North Street  
Hebron, OH 43025

Karen Sue Reed and Clyde Reed /  
RR 4 Box 237  
Moundsville, WV 26041

Boyde Buesking /  
402 Hickory Street  
Bloomington, IL 61701

Christian Drayer Staley /  
6725 Minier Road  
Minier, IL 61759

Rebecca Drayer Eldridge /  
465 Harts Way  
Collierville, TN 38017

Gennie Sue Thomas Petrack /  
704 N. School Street  
Normal, IL 61761

Brenda Faye Thomas Petrack /  
998 Willow Drive  
Pittsburgh, PA 15237

Guy Yates /  
4102 Blacks Road SW  
Hebron, OH 43025

Gail Ann Yates Wood /  
8161 Goldsmith Drive  
Reynoldsburg, OH 43068

Shirley Yates Hartsell /  
2150 Yorkdale Lane  
Reynoldsburg, OH 13068

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## 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

June 19, 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 Permits for the Michter Well Pad, Marshall County

Michter N-4HM

Dear Mr. Martin,

This well site will be accessed from Permit #06-2018-0480 issued to Tug Hill Operating for access to the State Road for a well site located off of Marshall County Route 76 SLS.

The operator has signed a DISTRICT WIDE 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  
 CH, OM, D-6  
 File

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JUN 17 2019

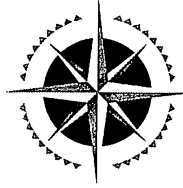
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4705102247



# TUG HILL

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

**Well No. Michter N-4HM**

<b>PRODUCT NAME:</b>	<b>CHEMICAL DESCRIPTION:</b>	<b>PRODUCT USE:</b>	<b>HAZARDOUS COMPONENT:</b>
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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# Michter Well Site

Site Design, Construction Plan, & Erosion and Sediment Control Plans  
Tug Hill Operating  
Marshall County  
Franklin District  
Latitude 39.80290097°  
Longitude -80.79714143°  
Lower Fish Creek Watershed

**APPROVED**  
**WVDEP OOG**  
WJS 10/12/2018

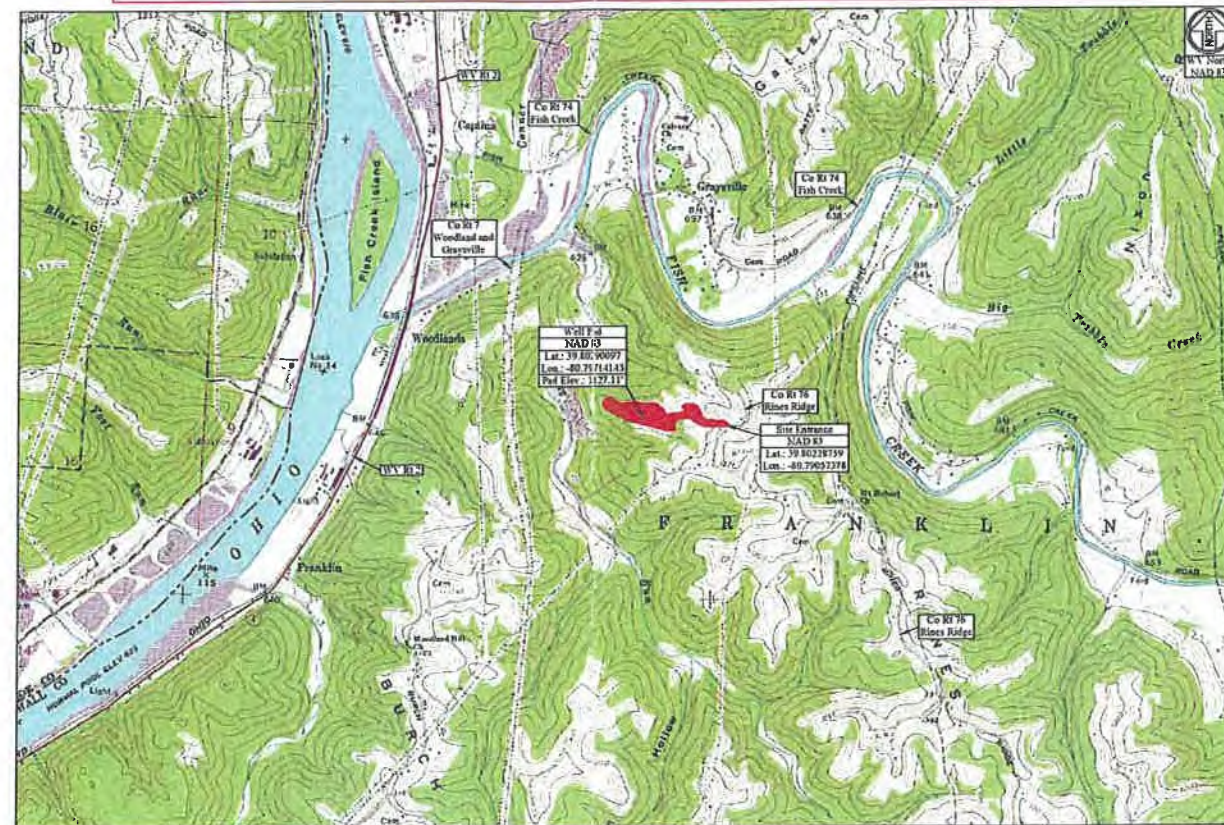
**Pertinent Site Information**  
Michter Well Site  
Emergency Number: 304-845-1920  
Franklin District, Marshall County, WV  
Watershed: Lower Fish Creek Watershed  
Tug Hill Contact Number: 1-817-632-3400



Property Owner Information - Michter Well Site

Owner	YSI - Parcel	Well Pad	Access Road	Topsoil	Clearing	Total Disturbed
Larry Dunlap Et Al	11-1	6.43	2.65	2.11	7.38	18.97
Larry Dunlap Et Al	11-4	0.00	0.00	0.39	0.39	0.78
Larry Dunlap	11-23	0.00	0.00	0.00	1.33	1.34
<b>Site Total (Ac)</b>	<b>6.39</b>	<b>2.63</b>	<b>2.33</b>	<b>9.43</b>	<b>21.11</b>	

## Exhibit A: Final Design: Issue for Permitting



WV State Plane Coordinate System  
North Zone, NAD 83  
Elevations Based on NAVD83  
Established by Survey Grade GPS  
and OPLUS Post-Processing

Access Road

Owner	YSI - Parcel	Road Length	Type
Larry Dunlap Et Al	11-1	1,653.30'	New Access Road Construction

Disturbed Area

Well Pad Construction	Ac
Well Pad Construction	8.49
Access Road Construction	2.53
Topsoil / Erosion Material	2.53
Additional Clearing	9.25
<b>Total Disturbed Area</b>	<b>21.11</b>

Additional Information

Total Wooded Acres Disturbed	Total Linear Feet of Access Road
19.10	1,653.30'

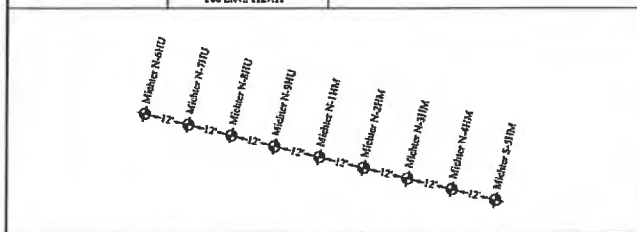
Michter Well Site Quantities

Description	Dist (CY)	Fill (CY)	Spill (CY)	Storm (CY)	Max. Slope	Length of Slope
Well Pad	18,540.34	65,684.85	11,053.53		N/A	N/A
Access Road	1,116.71	6,392.41		875.78	14.00%	402.40'
Topsoil/Grass Material Stockpiles	0.00	25,168.34		25,168.34	N/A	N/A
<b>Totals</b>	<b>19,657.05</b>	<b>97,245.59</b>	<b>11,053.53</b>	<b>26,343.94</b>		
<b>Total Spill (CY)</b>			<b>-14,981.41</b>			

(Excludes Spill Capacity)

Site Entrance

WV-NAD 83 N	WV-NAD 83 E
476538.42	477189.39
160520.57	160497.78
465902.29	477152.30
163238.00	163516.24
39.80297259	39.80290097
-80.79714143	-80.79714143
39.80232136	39.80242484
-80.79706134	-80.79732869
440383.43	440591.21
517328.02	517345.64
	Pod Elev: 1127.11'



Well Table

Well	WV-NAD 83 N	WV-NAD 83 E
Michter N-11U	477211.43	160324.25
Michter N-12U	477218.95	160396.01
Michter N-13U	477216.08	160397.66
Michter N-14U	477216.08	160397.66
Michter N-15U	477216.08	160397.66
Michter N-16U	477216.08	160397.66
Michter N-17U	477216.08	160397.66
Michter N-18U	477216.08	160397.66
Michter N-19U	477216.08	160397.66
Michter N-20U	477216.08	160397.66
Michter N-21U	477216.08	160397.66

Michter S-11U

WV-NAD 83 N	WV-NAD 83 E
477201.21	160396.31
477185.63	160404.26
163543.38	163543.38
39.80293907	39.80293907
-80.79736384	-80.79736384
39.80294909	39.80294909
-80.79735309	-80.79735309
440390.95	440390.95
517346.42	517346.42
	Pod Elev: 1127.11'



Site Locations (NAD 27)

Structure	Latitude (DD)	Longitude (DD)
Site Entrance	39.80291198	-80.79709111
Center of Well Pad	39.80282884	-80.79733409

Site Locations (NAD 83)

Structure	Latitude (DD)	Longitude (DD)
Site Entrance	39.80291759	-80.79731718
Center of Well Pad	39.80290697	-80.79714143

**Project Contacts**

**Tug Hill Operating**  
Jonathan White - Regulatory Analyst  
724-485-2000 Off, 304-649-7676 Cell  
Geoff Radler - V.P. Production  
817-632-5200 Off.

**Survey and Engineer**  
Kenneth Kelly  
304-338-6995 Off.  
John P. See  
304-442-0229 Off.  
Zachary Summerfield  
304-338-6987 Off.

**Tug Hill Operating, LLC**  
380 Southpointe Blvd  
Southpointe Plaza II, Suite 200  
Cranesburg, PA 15317

**Environmental:**  
Wellhead Delinquencies as provided by Allstar Ecology dated April 18, 2018.

**Topographic Information:**  
The topographic information shown herein is based on aerial photography by Blue Mountain Aerial Mapping, Darton, WV.

**MISS UTILITY OF WEST VIRGINIA**  
1-800-245-4848  
West Virginia State Law Section XIV, Chapter 24-C requires that you call the business days before you dig in the state of West Virginia. IT'S THE LAW.

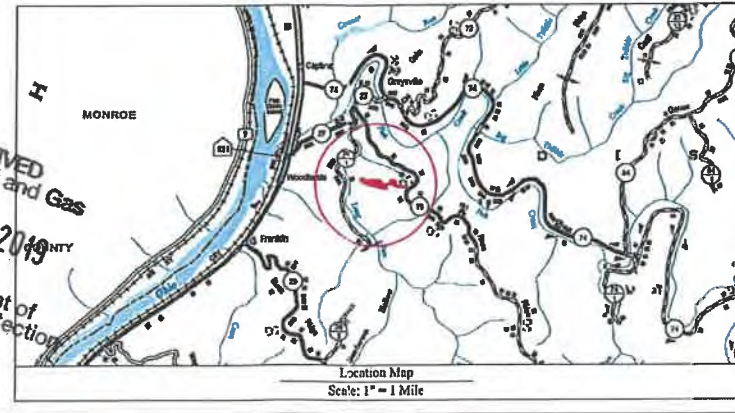
**811**  
Know what's below, Call before you dig.

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

The WV Mines Website was consulted. Previous (Current) mining activities are within the AOI.

WVDEP Website files show that there are no active and/or abandoned gas wells within the AOI.

**Approach Routes:**  
From the intersection of OH Rt 7 and WV Rt 2 near New Martinsville, WV. Travel North on WV Rt 2 for 13.0 mi. Turn Right onto Co Rt 27 (Woodland and Graysville). Follow Co Rt 27 for 1.0 mi. Turn Right onto Co Rt 76 (Rines Ridge). Follow Co Rt 76 for 1.5 mi. The site entrance will be on the Left (West) side of the road.



**Well Location Restrictions**

All Pad construction complies with the following restrictions:

- \*25' from an existing well or developed spring used for human or domestic animals.
- \*6' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy measured from the center of the pad.
- \*100' from the edge of disturbance to wetlands, perennial streams, natural or artificial lake, pond or reservoir.
- \*300' from the edge of disturbance to a naturally reproducing trout stream.
- \*1,000' of a surface or ground water intake to a public water supply.

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



The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Professions, Division of Environmental Protection, Office of Civil and Surveying.

All Plans, Sheets, and/or Reference Diagrams included in this design constitute a complete set of plans. A complete set of plans is necessary to construct the site in accordance with the design.

Zachary C. Summerfield  
Professional Engineer  
Date: 06-15-2018

Sheet Description

Sheet	Description
1	Cover Sheet
V1	Schedule of Quantities
N1-N4	Site Notes
2	Pre-Construction Site Conditions
3	Site Soil Map
4	Clearing Exhibit
5	Overall Plan View
6-7	E&S Plan View
8	Top Key Exhibit
9-10	Plan View
11-12	Cross Sections - Well Pad
13	Cross Sections - Access Road
G1-G3	Geotechnical Exhibit
L1	Landowner Disturbed Area Exhibit
S1	Site Reclamation
M1-M3	Production Exhibit
D1-D2	Erosion and Sediment Control Details
R1	Access Road Details
P1	Pad Details

**Michter Well Site**  
Franklin District  
Marshall County, WV

Date: 07/17/2018  
Scale: As Shown  
Designed By: ZS  
File No.  
Sheet 1 of 13



