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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)

Tuesday, December 10, 2019  
WELL WORK PERMIT  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for MICHTER N-2HM  
47-051-02276-00-00

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-2HM  
Farm Name: LARRY W. DUNLAP, ET AL  
U.S. WELL NUMBER: 47-051-02276-00-00  
Horizontal 6A New Drill  
Date Issued: 12/10/2019

A blue ink signature of James A. Martin, written in a cursive style, is positioned to the right of the permit details.

# 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.

## 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 (07/02/2018) 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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Permit well - Michter N-2HM

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
4705170812	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    Select datatypes:  (Check All)

Enter Permit #: 70812

Get Data    Reset

Location     Production     Plugging  
 Owner/Completion     Stratigraphy     Sample  
 Pay/ShowWater     Logs     Btm Hole Loc

- [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 = 70812

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_16	LAT_DD	LONG_DD	UTME	UTMN
4705170812	Marshall	70812	Franklin	Powhatan Point	Clanington	39.816428	-80.808965	516350.3	4407400.3

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_VO	PROP_TRGT_FM	TFM_EST_PR
4705170812	--	--	unknown	Pipity Map	C S Kirkman					-----	unknown		

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
4705170812	--	--	--	--	--	--	--	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

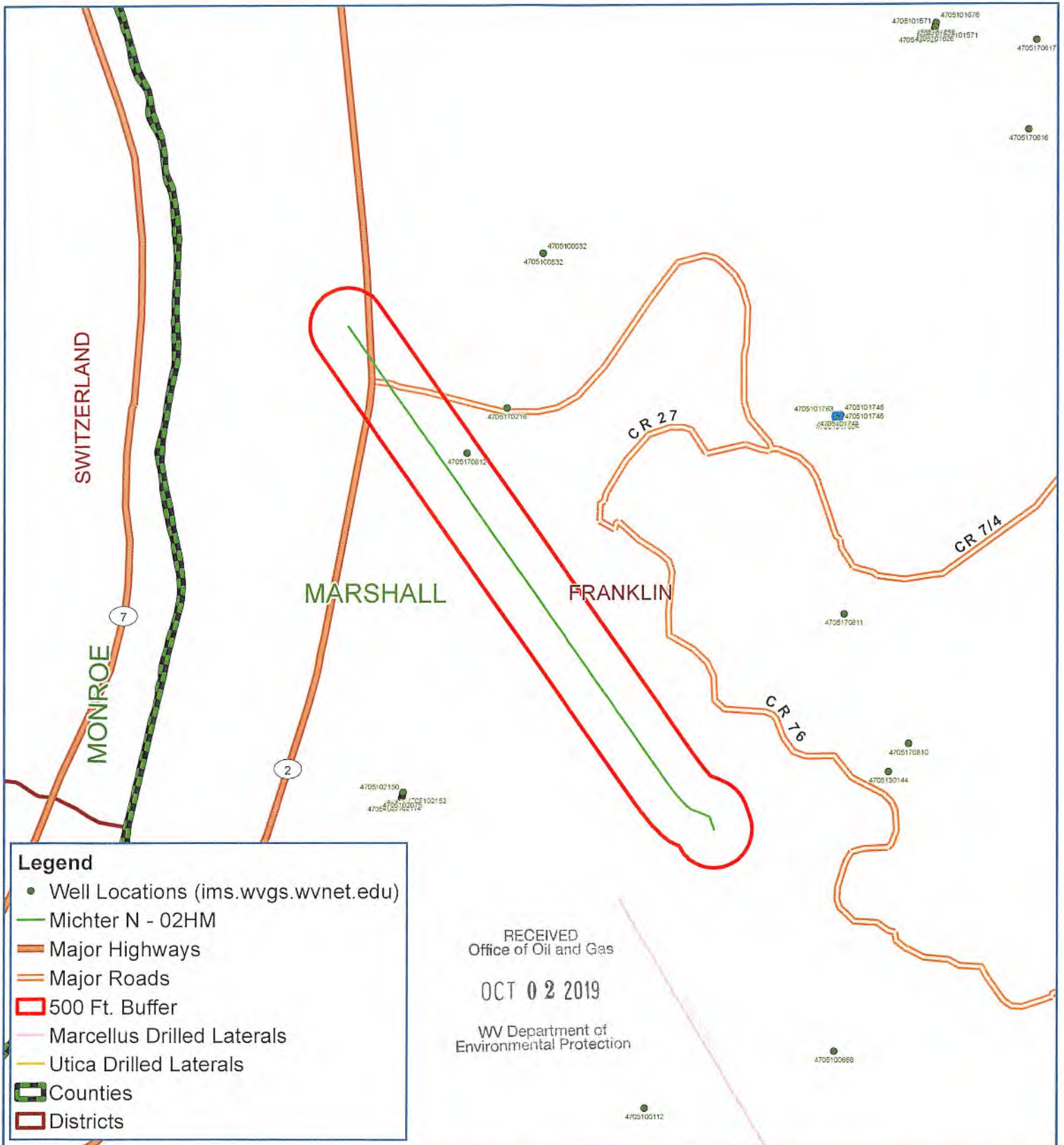
There is no Plugging data for this well

There is no Sample data for this well

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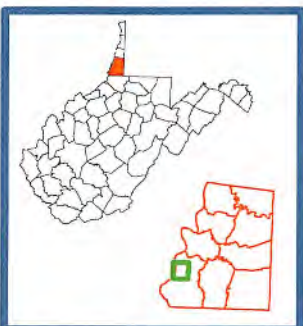


- Legend**
- Well Locations (ims.wvgs.wvnet.edu)
  - Michter N - 02HM
  - Major Highways
  - Major Roads
  - 500 Ft. Buffer
  - Marcellus Drilled Laterals
  - Utica Drilled Laterals
  - Counties
  - Districts

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# Michter N - 02HM Franklin District Marshall County, WV



Map Created: September 3, 2019  
Map Current As Of: September 3, 2019

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



WW-6B  
(04/15)

API NO. 47-051  
OPERATOR WELL NO. Michter N-2HM  
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  
Operator ID County District Quadrangle

2) Operator's Well Number: Michter N-2HM 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: 1,130.0'

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 6257'- 6311' thickness of 54' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,411'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 13,832'

11) Proposed Horizontal Leg Length: 7,166.91'

12) Approximate Fresh Water Strata Depths: 70', 716'

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

14) Approximate Saltwater Depths: 2,167'

15) Approximate Coal Seam Depths: Sewickly Coal - 615' and Pittsburgh Coal - 710'

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

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

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18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259ft^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#	2,652'	2,652'	870ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	13,832'	13,832'	3534ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,172'	
Liners							

*8/9/19*

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			
Sizes:	N/A			
Depths Set:	N/A			

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WW-6B  
(10/14)

API NO. 47-051 -

OPERATOR WELL NO. Michter N-2HM

Well Pad Name: Michter

*Michter*  
9/24/19

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 17,915,000 lb proppant and 276,979 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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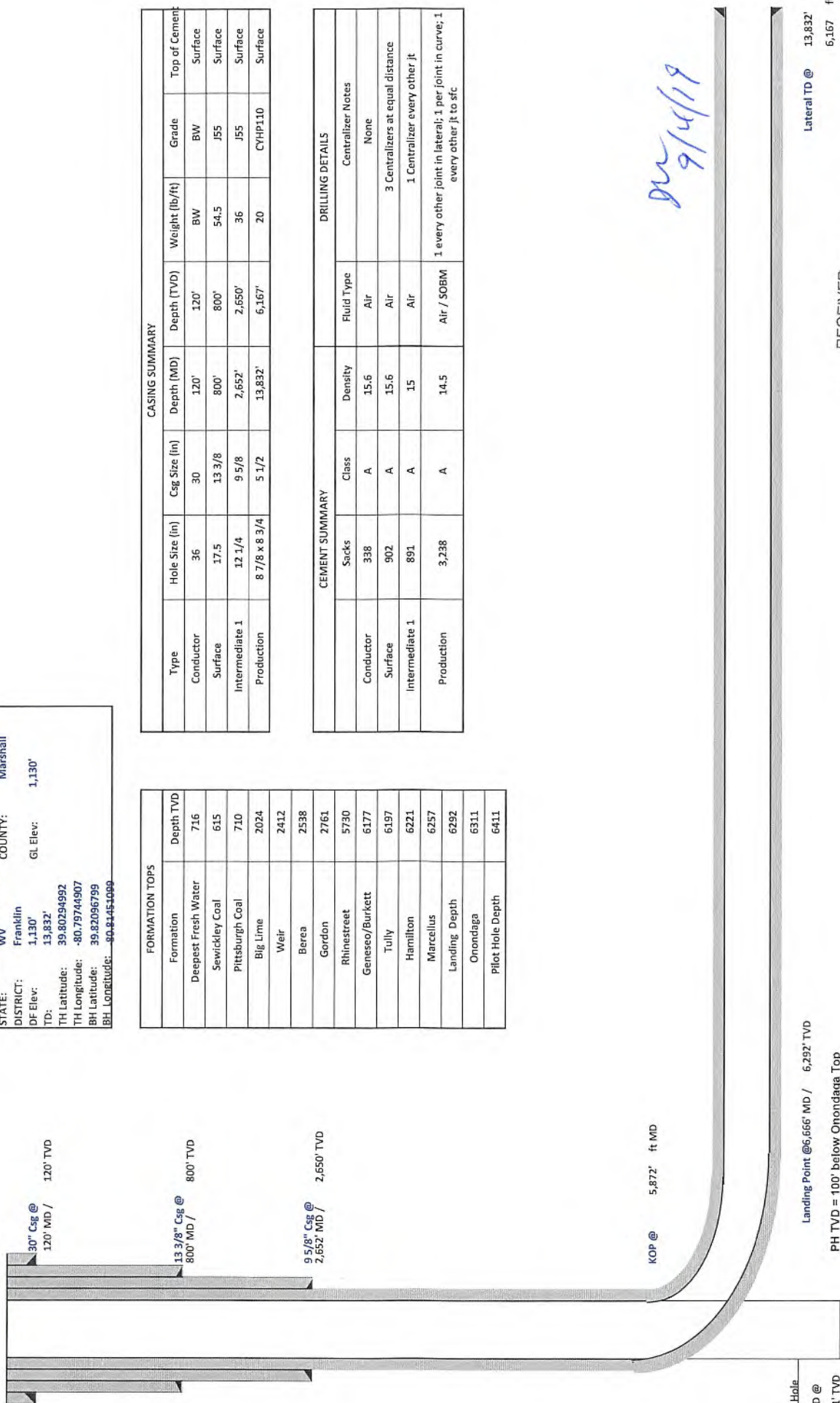
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\*Note: Attach additional sheets as needed.



**WELL NAME:** Michter N-2HM  
**STATE:** WV **COUNTY:** Marshall  
**DISTRICT:** Franklin  
**DF Elev:** 1,130' **GL Elev:** 1,130'  
**TD:** 13,832'  
**TH Latitude:** 39.80294992  
**BH Latitude:** -80.79744907  
**BH Longitude:** 39.822096799  
**BH Longitude:** 90.84451099



30" Csg @ 120' MD / 120' TVD

13 3/8" Csg @ 800' MD / 800' TVD

9 5/8" Csg @ 2,652' MD / 2,650' TVD

KOP @ 5,872' ft MD

Landing Point @ 6,666' MD / 6,292' TVD

PH TVD = 100' below Onondaga Top

Pilot Hole  
PH TD @ 6,411' TVD

FORMATION TOPS		Depth TVD
Formation		716
Deepest Fresh Water		615
Sewickley Coal		710
Pittsburgh Coal		2024
Big Lime		2412
Weir		2538
Berea		2761
Gordon		5730
Rhinestreet		6177
Genesee/Burkett		6197
Tully		6221
Hamilton		6257
Marcellus		6292
Landing Depth		6311
Onondaga		6411
Pilot Hole Depth		

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	2,652'	2,650'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	13,832'	6,167'	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	891	A	15	Air	1 Centralizer every other jt
Production	3,238	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

Lateral TD @ 13,832' ft MD  
6,167' ft TVD

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

**Michter N-2HM**

**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"	2,652'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	13,832'	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-02HM (D)  
**Site:** Michter  
**Project:** Marshall County, West Virginia  
**Design:** rev2

Azimuths to Grid North  
 True North: -0.13°  
 Magnetic North: -3.75°  
 Magnetic Field  
 Strength: 32089.00nt  
 Dip Angle: 66.12°  
 Date: 08/20/2018  
 Model: IGR72015

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

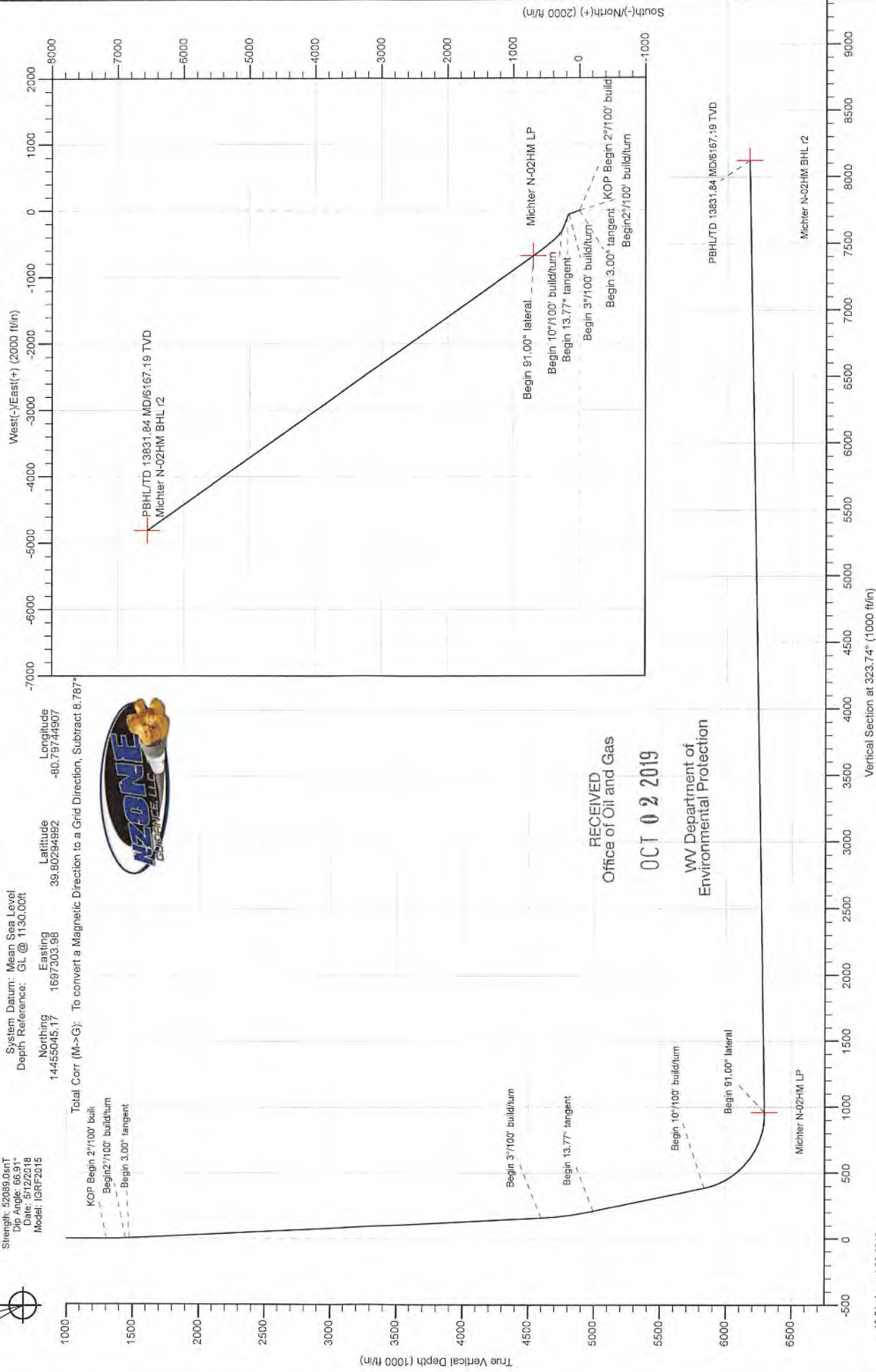
Northing 14455045.17 Easting 39.80294992 Longitude -80.78744907

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.787°



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	KOP Begin 2°/100' build
2	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	Begin 2°/100' build/turn
3	1450.00	3.00	350.00	1449.93	3.87	-0.68	2.00	350.000	3.52	Begin 3.00° tangent
4	1476.13	3.00	340.00	1476.03	5.18	-1.03	2.00	-84.993	4.79	
5	1976.13	3.00	340.00	1975.35	29.77	-9.98	0.00	0.000	29.91	Begin 3°/100' build/turn
6	4604.39	3.00	340.00	4600.00	159.03	-57.03	0.00	0.000	161.96	Begin 13.77° tangent
7	5003.23	13.77	292.11	4994.26	186.81	-104.76	3.00	-68.414	212.59	Begin 10°/100' build/turn
8	5871.97	13.77	292.11	5838.03	264.65	-296.36	0.00	0.000	388.69	Begin 91.00° lateral
9	6686.28	91.00	324.80	6292.00	596.16	-675.64	10.00	33.319	960.96	PBHLTD 13831.84 MD/6167.19 TVD
10	13831.84	91.00	324.80	6167.19	6550.53	-4805.53	0.00	0.000	8124.20	PBHLTD 13831.84 MD/6167.19 TVD



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Planning Report - Geographic

Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Michter N-02HM (D)
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-02HM (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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

Site	Michter				
Site Position:		Northing:	14,454,962.42 usft	Latitude:	39.80272253
From:	Lat/Long	Easting:	1,697,325.45 usft	Longitude:	-80.79737330
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.130 °

Well	Michter N-02HM (D)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,045.17 usft	Latitude:	39.80294992
	+E/-W	0.00 ft	Easting:	1,697,303.98 usft	Longitude:	-80.79744907
Position Uncertainty	0.00 ft	Wellhead Elevation:		Ground Level:	1,130.00 ft	

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/12/2018	-8.657	66.906	52,088.95266609

Design	rev2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	323.74

Plan Survey Tool Program	Date	8/30/2019		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	13,831.84 rev2 (Original Hole)	MWD	
			MWD - Standard	

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Planning Report - Geographic

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Michter N-02HM (D)
<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-02HM (D)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev2		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.000	
1,450.00	3.00	350.00	1,449.93	3.87	-0.68	2.00	2.00	0.00	350.000	
1,476.13	3.00	340.00	1,476.03	5.18	-1.03	2.00	0.00	-38.26	-94.993	
1,976.13	3.00	340.00	1,975.35	29.77	-9.98	0.00	0.00	0.00	0.000	
4,604.39	3.00	340.00	4,600.00	159.03	-57.03	0.00	0.00	0.00	0.000	
5,003.23	13.77	292.11	4,994.26	186.81	-104.76	3.00	2.70	-12.01	-58.414	
5,871.97	13.77	292.11	5,838.03	264.65	-296.36	0.00	0.00	0.00	0.000	
6,666.28	91.00	324.80	6,292.00	696.16	-675.64	10.00	9.72	4.12	33.319	Michter N-02HM LP
13,831.84	91.00	324.80	6,167.19	6,550.53	-4,805.53	0.00	0.00	0.00	0.000	Michter N-02HM BHL

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Planning Report - Geographic

WV Department of  
Environmental Protection

Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Michter N-02HM (D)
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-02HM (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
100.00	0.00	0.00	100.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
200.00	0.00	0.00	200.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
300.00	0.00	0.00	300.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
400.00	0.00	0.00	400.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
500.00	0.00	0.00	500.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
600.00	0.00	0.00	600.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
700.00	0.00	0.00	700.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
800.00	0.00	0.00	800.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
900.00	0.00	0.00	900.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,455,045.17	1,697,303.98	39.80294992	-80.79744907	
<b>KOP Begin 2°/100' build</b>										
1,400.00	2.00	350.00	1,399.98	1.72	-0.30	14,455,046.89	1,697,303.68	39.80295464	-80.79745014	
1,450.00	3.00	350.00	1,449.93	3.87	-0.68	14,455,049.04	1,697,303.30	39.80296054	-80.79745147	
<b>Begin 2°/100' build/turn</b>										
1,476.13	3.00	340.00	1,476.03	5.18	-1.03	14,455,050.36	1,697,302.95	39.80296416	-80.79745271	
<b>Begin 3.00° tangent</b>										
1,500.00	3.00	340.00	1,499.86	6.36	-1.46	14,455,051.53	1,697,302.52	39.80296739	-80.79745422	
1,600.00	3.00	340.00	1,599.73	11.27	-3.25	14,455,056.45	1,697,300.73	39.80298090	-80.79746056	
1,700.00	3.00	340.00	1,699.59	16.19	-5.04	14,455,061.37	1,697,298.94	39.80298442	-80.79746689	
1,800.00	3.00	340.00	1,799.45	21.11	-6.83	14,455,066.28	1,697,297.15	39.80300794	-80.79747323	
1,900.00	3.00	340.00	1,899.31	26.03	-8.62	14,455,071.20	1,697,295.36	39.80302146	-80.79747956	
1,976.13	3.00	340.00	1,975.35	29.77	-9.98	14,455,074.95	1,697,294.00	39.80303175	-80.79748438	
2,000.00	3.00	340.00	1,999.18	30.95	-10.41	14,455,076.12	1,697,293.57	39.80303497	-80.79748589	
2,100.00	3.00	340.00	2,099.04	35.86	-12.20	14,455,081.04	1,697,291.78	39.80304849	-80.79749223	
2,200.00	3.00	340.00	2,198.90	40.78	-13.99	14,455,085.96	1,697,289.99	39.80306201	-80.79749856	
2,300.00	3.00	340.00	2,298.77	45.70	-15.78	14,455,090.87	1,697,288.20	39.80307552	-80.79750489	
2,400.00	3.00	340.00	2,398.63	50.62	-17.57	14,455,095.79	1,697,286.41	39.80308904	-80.79751123	
2,500.00	3.00	340.00	2,498.49	55.54	-19.36	14,455,100.71	1,697,284.62	39.80310256	-80.79751756	
2,600.00	3.00	340.00	2,598.36	60.45	-21.15	14,455,105.63	1,697,282.83	39.80311608	-80.79752389	
2,700.00	3.00	340.00	2,698.22	65.37	-22.94	14,455,110.55	1,697,281.04	39.80312959	-80.79753023	
2,800.00	3.00	340.00	2,798.08	70.29	-24.73	14,455,115.46	1,697,279.25	39.80314311	-80.79753656	
2,900.00	3.00	340.00	2,897.94	75.21	-26.52	14,455,120.38	1,697,277.46	39.80315663	-80.79754290	
3,000.00	3.00	340.00	2,997.81	80.13	-28.31	14,455,125.30	1,697,275.67	39.80317014	-80.79754923	
3,100.00	3.00	340.00	3,097.67	85.04	-30.10	14,455,130.22	1,697,273.88	39.80318366	-80.79755556	
3,200.00	3.00	340.00	3,197.53	89.96	-31.89	14,455,135.14	1,697,272.09	39.80319718	-80.79756190	
3,300.00	3.00	340.00	3,297.40	94.88	-33.68	14,455,140.05	1,697,270.30	39.80321070	-80.79756823	
3,400.00	3.00	340.00	3,397.26	99.80	-35.47	14,455,144.97	1,697,268.51	39.80322421	-80.79757457	
3,500.00	3.00	340.00	3,497.12	104.72	-37.26	14,455,149.89	1,697,266.72	39.80323773	-80.79758090	
3,600.00	3.00	340.00	3,596.99	109.63	-39.05	14,455,154.81	1,697,264.93	39.80325125	-80.79758723	
3,700.00	3.00	340.00	3,696.85	114.55	-40.84	14,455,159.72	1,697,263.14	39.80326476	-80.79759357	
3,800.00	3.00	340.00	3,796.71	119.47	-42.63	14,455,164.64	1,697,261.35	39.80327828	-80.79759990	
3,900.00	3.00	340.00	3,896.57	124.39	-44.42	14,455,169.56	1,697,259.56	39.80329180	-80.79760623	
4,000.00	3.00	340.00	3,996.44	129.31	-46.21	14,455,174.48	1,697,257.77	39.80330532	-80.79761257	
4,100.00	3.00	340.00	4,096.30	134.22	-48.00	14,455,179.40	1,697,255.98	39.80331883	-80.79761890	
4,200.00	3.00	340.00	4,196.16	139.14	-49.79	14,455,184.31	1,697,254.19	39.80333235	-80.79762524	
4,300.00	3.00	340.00	4,296.03	144.06	-51.58	14,455,189.23	1,697,252.40	39.80334587	-80.79763157	
4,400.00	3.00	340.00	4,395.89	148.98	-53.37	14,455,194.15	1,697,250.61	39.80335938	-80.79763790	
4,500.00	3.00	340.00	4,495.75	153.90	-55.16	14,455,199.07	1,697,248.82	39.80337290	-80.79764424	
4,600.00	3.00	340.00	4,595.61	158.81	-56.95	14,455,203.99	1,697,247.03	39.80338642	-80.79765057	



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Planning Report - Geographic

WV Department of  
Environmental Protection

Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Michter N-02HM (D)
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-02HM (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,604.39	3.00	340.00	4,600.00	159.03	-57.03	14,455,204.20	1,697,246.95	39.80338701	-80.79765085	
<b>Begin 3°/100' build/turn</b>										
4,700.00	5.12	311.48	4,695.37	164.21	-61.08	14,455,209.38	1,697,242.90	39.80340126	-80.79766524	
4,800.00	7.86	300.47	4,794.73	170.64	-70.33	14,455,215.81	1,697,233.65	39.80341897	-80.79769810	
4,900.00	10.75	295.22	4,893.40	178.08	-84.66	14,455,223.25	1,697,219.32	39.80343950	-80.79774908	
5,000.00	13.68	292.19	4,991.13	186.52	-104.05	14,455,231.69	1,697,199.93	39.80346280	-80.79781803	
5,003.23	13.77	292.11	4,994.27	186.81	-104.76	14,455,231.98	1,697,199.22	39.80346359	-80.79782056	
<b>Begin 13.77° tangent</b>										
5,100.00	13.77	292.11	5,088.25	195.48	-126.10	14,455,240.65	1,697,177.88	39.80348754	-80.79789648	
5,200.00	13.77	292.11	5,185.38	204.44	-148.15	14,455,249.61	1,697,155.83	39.80351229	-80.79797493	
5,300.00	13.77	292.11	5,282.50	213.40	-170.21	14,455,258.57	1,697,133.77	39.80353703	-80.79805339	
5,400.00	13.77	292.11	5,379.63	222.36	-192.26	14,455,267.53	1,697,111.72	39.80356178	-80.79813185	
5,500.00	13.77	292.11	5,476.75	231.32	-214.32	14,455,276.49	1,697,089.66	39.80358652	-80.79821031	
5,600.00	13.77	292.11	5,573.88	240.28	-236.37	14,455,285.45	1,697,067.61	39.80361127	-80.79828876	
5,700.00	13.77	292.11	5,671.00	249.24	-258.43	14,455,294.42	1,697,045.55	39.80363601	-80.79836722	
5,800.00	13.77	292.11	5,768.13	258.20	-280.48	14,455,303.38	1,697,023.50	39.80366075	-80.79844568	
5,871.97	13.77	292.11	5,838.03	264.65	-296.36	14,455,309.82	1,697,007.62	39.80367856	-80.79850214	
<b>Begin 10°/100' build/turn</b>										
5,900.00	16.19	297.64	5,865.11	267.72	-302.91	14,455,312.89	1,697,001.07	39.80368703	-80.79852545	
6,000.00	25.44	308.57	5,958.51	287.63	-332.13	14,455,332.80	1,696,971.85	39.80374189	-80.79862932	
6,100.00	35.09	313.85	6,044.80	321.02	-369.75	14,455,366.19	1,696,934.24	39.80383382	-80.79876299	
6,200.00	44.88	317.06	6,121.33	366.87	-414.63	14,455,412.05	1,696,889.36	39.80396002	-80.79892243	
6,300.00	54.73	319.32	6,185.80	423.80	-465.40	14,455,468.97	1,696,838.58	39.80411667	-80.79910277	
6,400.00	64.61	321.08	6,236.23	490.07	-520.53	14,455,535.24	1,696,783.45	39.80429900	-80.79929854	
6,500.00	74.52	322.57	6,271.11	563.67	-578.34	14,455,608.84	1,696,725.64	39.80450148	-80.79950379	
6,600.00	84.43	323.93	6,289.36	642.36	-637.08	14,455,687.53	1,696,666.91	39.80471794	-80.79971228	
6,666.28	91.00	324.80	6,292.00	696.16	-675.64	14,455,741.33	1,696,628.34	39.80486592	-80.79984917	
<b>Begin 91.00° lateral</b>										
6,700.00	91.00	324.80	6,291.41	723.70	-695.07	14,455,768.87	1,696,608.91	39.80494169	-80.79991814	
6,800.00	91.00	324.80	6,289.67	805.40	-752.71	14,455,850.58	1,696,551.27	39.80516642	-80.80012271	
6,900.00	91.00	324.80	6,287.93	887.11	-810.34	14,455,932.28	1,696,493.64	39.80539115	-80.80032728	
7,000.00	91.00	324.80	6,286.19	968.81	-867.98	14,456,013.98	1,696,436.00	39.80561587	-80.80053185	
7,100.00	91.00	324.80	6,284.45	1,050.51	-925.61	14,456,095.68	1,696,378.37	39.80584060	-80.80073643	
7,200.00	91.00	324.80	6,282.70	1,132.21	-983.25	14,456,177.38	1,696,320.73	39.80606533	-80.80094100	
7,300.00	91.00	324.80	6,280.96	1,213.91	-1,040.88	14,456,259.08	1,696,263.10	39.80629005	-80.80114558	
7,400.00	91.00	324.80	6,279.22	1,295.61	-1,098.52	14,456,340.78	1,696,205.46	39.80651478	-80.80135015	
7,500.00	91.00	324.80	6,277.48	1,377.31	-1,156.16	14,456,422.49	1,696,147.83	39.80673950	-80.80155473	
7,600.00	91.00	324.80	6,275.74	1,459.02	-1,213.79	14,456,504.19	1,696,090.19	39.80696423	-80.80175931	
7,700.00	91.00	324.80	6,273.99	1,540.72	-1,271.43	14,456,585.89	1,696,032.56	39.80718895	-80.80196389	
7,800.00	91.00	324.80	6,272.25	1,622.42	-1,329.06	14,456,667.59	1,695,974.92	39.80741368	-80.80216847	
7,900.00	91.00	324.80	6,270.51	1,704.12	-1,386.70	14,456,749.29	1,695,917.29	39.80763840	-80.80237306	
8,000.00	91.00	324.80	6,268.77	1,785.82	-1,444.33	14,456,830.99	1,695,859.65	39.80786312	-80.80257764	
8,100.00	91.00	324.80	6,267.03	1,867.52	-1,501.97	14,456,912.69	1,695,802.02	39.80808785	-80.80278223	
8,200.00	91.00	324.80	6,265.29	1,949.23	-1,559.60	14,456,994.40	1,695,744.38	39.80831257	-80.80298681	
8,300.00	91.00	324.80	6,263.54	2,030.93	-1,617.24	14,457,076.10	1,695,686.75	39.80853729	-80.80319140	
8,400.00	91.00	324.80	6,261.80	2,112.63	-1,674.87	14,457,157.80	1,695,629.11	39.80876201	-80.80339599	
8,500.00	91.00	324.80	6,260.06	2,194.33	-1,732.51	14,457,239.50	1,695,571.48	39.80898673	-80.80360058	
8,600.00	91.00	324.80	6,258.32	2,276.03	-1,790.14	14,457,321.20	1,695,513.84	39.80921146	-80.80380518	
8,700.00	91.00	324.80	6,256.58	2,357.73	-1,847.78	14,457,402.90	1,695,456.21	39.80943618	-80.80400977	
8,800.00	91.00	324.80	6,254.83	2,439.43	-1,905.41	14,457,484.60	1,695,398.57	39.80966090	-80.80421437	
8,900.00	91.00	324.80	6,253.09	2,521.14	-1,963.05	14,457,566.30	1,695,340.94	39.80988562	-80.80441896	
9,000.00	91.00	324.80	6,251.35	2,602.84	-2,020.68	14,457,648.01	1,695,283.30	39.81011034	-80.80462356	
9,100.00	91.00	324.80	6,249.61	2,684.54	-2,078.32	14,457,729.71	1,695,225.66	39.81033506	-80.80482816	
9,200.00	91.00	324.80	6,247.87	2,766.24	-2,135.95	14,457,811.41	1,695,168.03	39.81055977	-80.80503276	

OCT 02 2019



Planning Report - Geographic

WV Department of  
Environmental Protection

Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Michter N-02HM (D)
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-02HM (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,300.00	91.00	324.80	6,246.13	2,847.94	-2,193.59	14,457,893.11	1,695,110.39	39.81078449	-80.80523736	
9,400.00	91.00	324.80	6,244.38	2,929.64	-2,251.23	14,457,974.81	1,695,052.76	39.81100921	-80.80544197	
9,500.00	91.00	324.80	6,242.64	3,011.35	-2,308.86	14,458,056.51	1,694,995.12	39.81123393	-80.80564657	
9,600.00	91.00	324.80	6,240.90	3,093.05	-2,366.50	14,458,138.21	1,694,937.49	39.81145865	-80.80585118	
9,700.00	91.00	324.80	6,239.16	3,174.75	-2,424.13	14,458,219.92	1,694,879.85	39.81168336	-80.80605578	
9,800.00	91.00	324.80	6,237.42	3,256.45	-2,481.77	14,458,301.62	1,694,822.22	39.81190808	-80.80626039	
9,900.00	91.00	324.80	6,235.68	3,338.15	-2,539.40	14,458,383.32	1,694,764.58	39.81213280	-80.80646500	
10,000.00	91.00	324.80	6,233.93	3,419.85	-2,597.04	14,458,465.02	1,694,706.95	39.81235751	-80.80666961	
10,100.00	91.00	324.80	6,232.19	3,501.55	-2,654.67	14,458,546.72	1,694,649.31	39.81258223	-80.80687423	
10,200.00	91.00	324.80	6,230.45	3,583.26	-2,712.31	14,458,628.42	1,694,591.68	39.81280694	-80.80707884	
10,300.00	91.00	324.80	6,228.71	3,664.96	-2,769.94	14,458,710.12	1,694,534.04	39.81303166	-80.80728346	
10,400.00	91.00	324.80	6,226.97	3,746.66	-2,827.58	14,458,791.83	1,694,476.41	39.81325637	-80.80748807	
10,500.00	91.00	324.80	6,225.22	3,828.36	-2,885.21	14,458,873.53	1,694,418.77	39.81348109	-80.80769269	
10,600.00	91.00	324.80	6,223.48	3,910.06	-2,942.85	14,458,955.23	1,694,361.14	39.81370580	-80.80789731	
10,700.00	91.00	324.80	6,221.74	3,991.76	-3,000.48	14,459,036.93	1,694,303.50	39.81393051	-80.80810193	
10,800.00	91.00	324.80	6,220.00	4,073.47	-3,058.12	14,459,118.63	1,694,245.87	39.81415523	-80.80830655	
10,900.00	91.00	324.80	6,218.26	4,155.17	-3,115.75	14,459,200.33	1,694,188.23	39.81437994	-80.80851117	
11,000.00	91.00	324.80	6,216.52	4,236.87	-3,173.39	14,459,282.03	1,694,130.60	39.81460465	-80.80871580	
11,100.00	91.00	324.80	6,214.77	4,318.57	-3,231.02	14,459,363.74	1,694,072.96	39.81482936	-80.80892043	
11,200.00	91.00	324.80	6,213.03	4,400.27	-3,288.66	14,459,445.44	1,694,015.33	39.81505408	-80.80912505	
11,300.00	91.00	324.80	6,211.29	4,481.97	-3,346.30	14,459,527.14	1,693,957.69	39.81527879	-80.80932968	
11,400.00	91.00	324.80	6,209.55	4,563.68	-3,403.93	14,459,608.84	1,693,900.06	39.81550350	-80.80953431	
11,500.00	91.00	324.80	6,207.81	4,645.38	-3,461.57	14,459,690.54	1,693,842.42	39.81572821	-80.80973894	
11,600.00	91.00	324.80	6,206.06	4,727.08	-3,519.20	14,459,772.24	1,693,784.79	39.81595292	-80.80994357	
11,700.00	91.00	324.80	6,204.32	4,808.78	-3,576.84	14,459,853.94	1,693,727.15	39.81617763	-80.81014821	
11,800.00	91.00	324.80	6,202.58	4,890.48	-3,634.47	14,459,935.65	1,693,669.52	39.81640234	-80.81035284	
11,900.00	91.00	324.80	6,200.84	4,972.18	-3,692.11	14,460,017.35	1,693,611.88	39.81662705	-80.81055748	
12,000.00	91.00	324.80	6,199.10	5,053.88	-3,749.74	14,460,099.05	1,693,554.25	39.81685175	-80.81076212	
12,100.00	91.00	324.80	6,197.36	5,135.59	-3,807.38	14,460,180.75	1,693,496.61	39.81707646	-80.81096676	
12,200.00	91.00	324.80	6,195.61	5,217.29	-3,865.01	14,460,262.45	1,693,438.98	39.81730117	-80.81117140	
12,300.00	91.00	324.80	6,193.87	5,298.99	-3,922.65	14,460,344.15	1,693,381.34	39.81752588	-80.81137604	
12,400.00	91.00	324.80	6,192.13	5,380.69	-3,980.28	14,460,425.85	1,693,323.71	39.81775059	-80.81158068	
12,500.00	91.00	324.80	6,190.39	5,462.39	-4,037.92	14,460,507.55	1,693,266.07	39.81797529	-80.81178533	
12,600.00	91.00	324.80	6,188.65	5,544.09	-4,095.55	14,460,589.26	1,693,208.43	39.81820000	-80.81198997	
12,700.00	91.00	324.80	6,186.90	5,625.80	-4,153.19	14,460,670.96	1,693,150.80	39.81842471	-80.81219462	
12,800.00	91.00	324.80	6,185.16	5,707.50	-4,210.82	14,460,752.66	1,693,093.16	39.81864941	-80.81239927	
12,900.00	91.00	324.80	6,183.42	5,789.20	-4,268.46	14,460,834.36	1,693,035.53	39.81887412	-80.81260392	
13,000.00	91.00	324.80	6,181.68	5,870.90	-4,326.09	14,460,916.06	1,692,977.89	39.81909882	-80.81280857	
13,100.00	91.00	324.80	6,179.94	5,952.60	-4,383.73	14,460,997.76	1,692,920.26	39.81932353	-80.81301322	
13,200.00	91.00	324.80	6,178.20	6,034.30	-4,441.37	14,461,079.46	1,692,862.62	39.81954823	-80.81321788	
13,300.00	91.00	324.80	6,176.45	6,116.00	-4,499.00	14,461,161.17	1,692,804.99	39.81977293	-80.81342253	
13,400.00	91.00	324.80	6,174.71	6,197.71	-4,556.64	14,461,242.87	1,692,747.35	39.81999764	-80.81362719	
13,500.00	91.00	324.80	6,172.97	6,279.41	-4,614.27	14,461,324.57	1,692,689.72	39.82022234	-80.81383185	
13,600.00	91.00	324.80	6,171.23	6,361.11	-4,671.91	14,461,406.27	1,692,632.08	39.82044704	-80.81403651	
13,700.00	91.00	324.80	6,169.49	6,442.81	-4,729.54	14,461,487.97	1,692,574.45	39.82067175	-80.81424117	
13,800.00	91.00	324.80	6,167.74	6,524.51	-4,787.18	14,461,569.67	1,692,516.81	39.82089645	-80.81444583	
13,831.84	91.00	324.80	6,167.19	6,550.53	-4,805.53	14,461,595.69	1,692,498.46	39.82096799	-80.81451099	

PBHL/TD 13831.84 MD/6167.19 TVD



Planning Report - Geographic

Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Michter N-02HM (D)
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-02HM (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(usft)	(usft)		
- Shape									
Michter N-02HM BHL r2 - plan hits target center - Point	0.00	0.00	6,167.19	6,550.53	-4,805.53	14,461,595.69	1,692,498.46	39.82096800	-80.81451100
Michter N-02HM LP - plan hits target center - Point	0.00	0.00	6,292.00	696.16	-675.64	14,455,741.33	1,696,628.34	39.80486592	-80.79984917

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
		+N/-S	+E/-W		
(ft)	(ft)	(ft)	(ft)		
1,300.00	1,300.00	0.00	0.00	KOP Begin 2°/100' build	
1,450.00	1,449.93	3.87	-0.68	Begin 2°/100' build/turn	
1,476.13	1,476.03	5.18	-1.03	Begin 3.00° tangent	
1,976.13	1,975.35	29.77	-9.98		
4,604.39	4,600.00	159.03	-57.03	Begin 3°/100' build/turn	
5,003.23	4,994.27	186.81	-104.76	Begin 13.77° tangent	
5,871.97	5,838.03	264.65	-296.36	Begin 10°/100' build/turn	
6,666.28	6,292.00	696.16	-675.64	Begin 91.00° lateral	
13,831.84	6,167.19	6,550.53	-4,805.53	PBHL/TD 13831.84 MD/6167.19 TVD	

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WW-9  
(4/16)

API Number 47 - 051 - \_\_\_\_\_

Operator's Well No. Michter N-2HM

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 / WV0109185) 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.

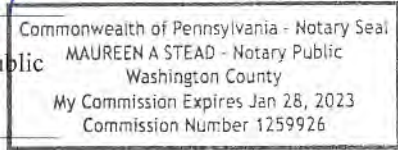
I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is 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 Jim Pancake  
Company Official (Typed Name) Jim Pancake  
Company Official Title VP Geosciences

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Environmental Protection

Subscribed and sworn before me this 3 day of SEPTEMBER, 2019

Maureen A Stead  
My commission expires 1/28/23



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

**Attach:**

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Wilber*

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

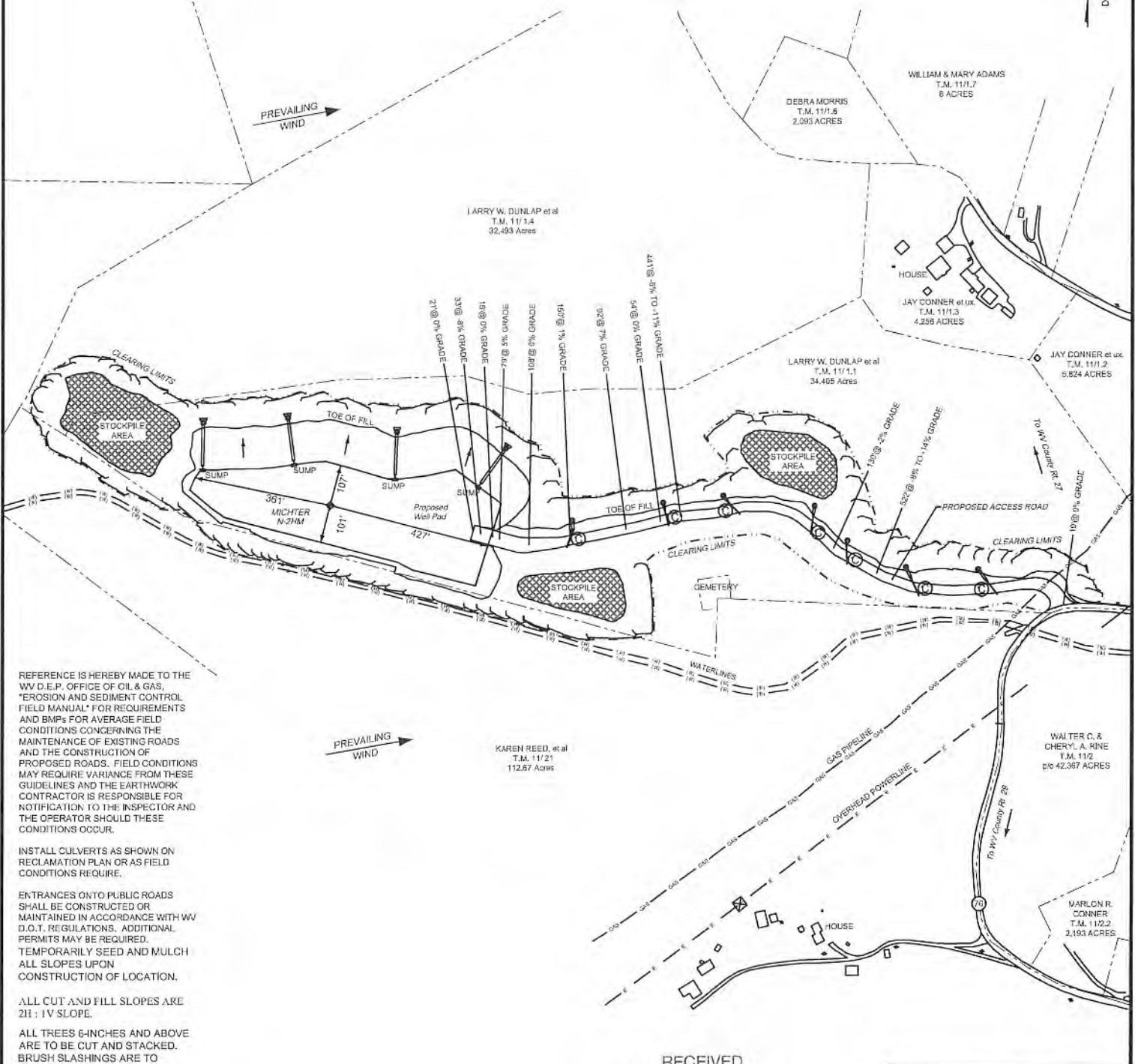
Title: Oil and Gas Inspector

Date: 9/4/19

Field Reviewed? (  ) Yes (  ) No

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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.

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**LEGEND**

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

**Jackson Surveying Inc.**  
 2418 E. Pike St., #112  
 Clarksburg, WV 26301  
 Phone: 304-628-5861

TOPO SECTION:		OPERATOR:	
POWHATAN POINT 7.5'		TUG HILL OPERATING, LLC	
COUNTY	DISTRICT	380 SOUTHPOINTE BLVD	
MARSHALL	FRANKLIN	SUITE 200	
DRAWN BY	JOB NO.	DATE	SCALE
J.D.C.	494510851	08-23-2019	NONE

**TUG HILL  
OPERATING**



# Well Site Safety Plan

## Tug Hill Operating, LLC

*JM*  
9/14/19

Well Name: Michter N-2HM

Pad Location: Michter Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,405,906.58

Easting: 517,339.29

September 2019

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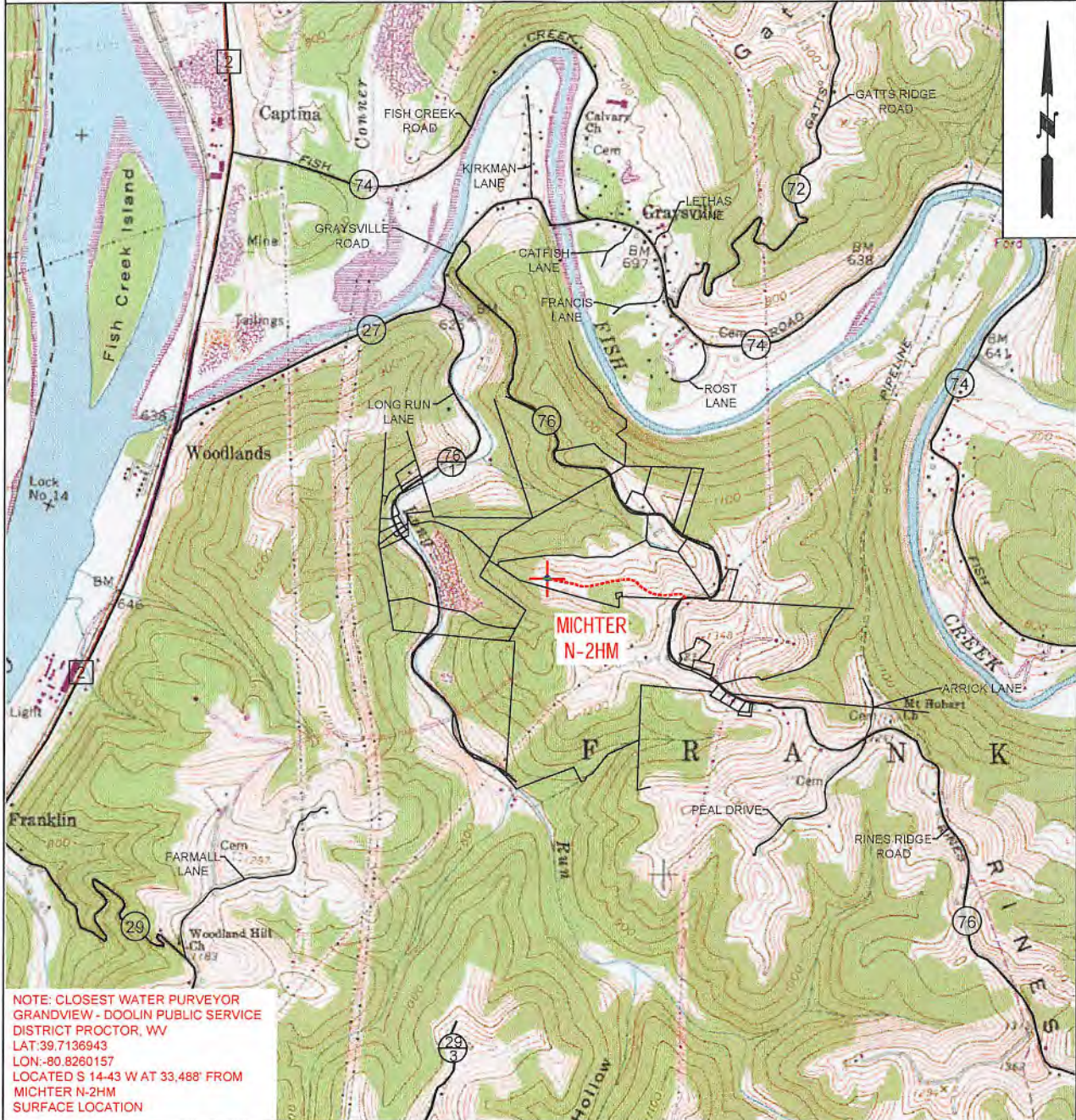
OCT 02 2019

WV Department of  
Environmental Protection

WW-9

# PROPOSED MICHTER N-2HM

SUPPLEMENT PG 2



NOTE: CLOSEST WATER PURVEYOR  
GRANDVIEW - DOOLIN PUBLIC SERVICE  
DISTRICT PROCTOR, WV  
LAT: 39.7136943  
LON: -80.8260157  
LOCATED S 14-43 W AT 33.488' FROM  
MICHTER N-2HM  
SURFACE LOCATION



**TUG HILL**  
OPERATING

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

**TOPO SECTION**

POWHATAN POINT 7.5'

**SCALE:**

1" = 2000'

**LEASE NAME**

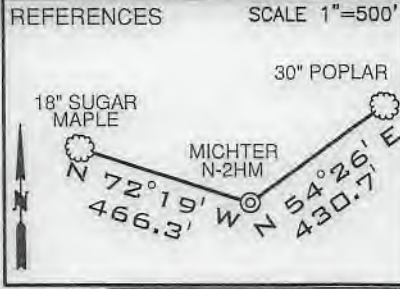
MICHTER

**DATE:**

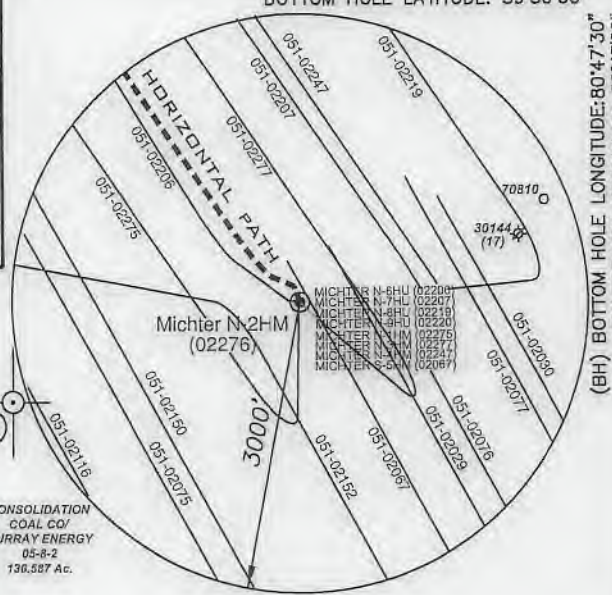
DATE: 08-26-2019



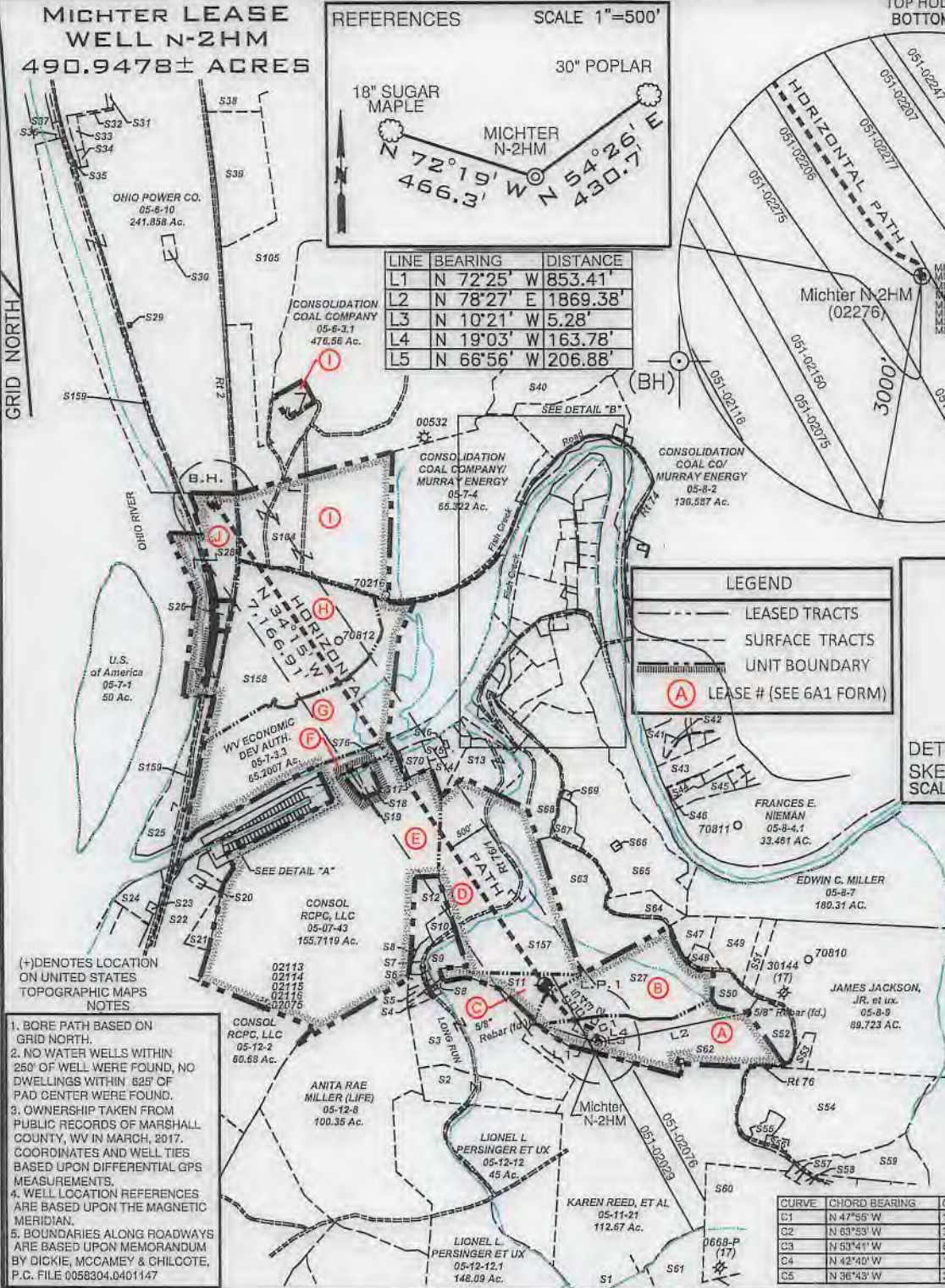
# MICHTER LEASE WELL N-2HM 490.9478± ACRES



LINE	BEARING	DISTANCE
L1	N 72°25' W	853.41'
L2	N 78°27' E	1869.38'
L3	N 10°21' W	5.28'
L4	N 19°03' W	163.78'
L5	N 66°56' W	206.88'



GRID NORTH



**LEGEND**

- LEASED TRACTS
- SURFACE TRACTS
- UNIT BOUNDARY
- LEASE # (SEE 6A1 FORM)

**DETAIL SKETCH "A" SCALE 1"=100'**

- MICHTER N-6HU (02206)
- MICHTER N-7HU (02207)
- MICHTER N-8HU (02216)
- MICHTER N-9HU (02220)
- MICHTER N-1HM (02275)
- MICHTER N-2HM (02276)
- MICHTER N-3HM (02278)
- MICHTER N-4HM (02277)
- MICHTER S-5HM (02247)

**SURFACE HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
(TH)

N) 4,405,906.58  
E) 517,339.29

**LANDING POINT 1**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,406,118.77  
E) 517,133.35

**BOTTOM HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,407,903.18  
E) 515,874.56

CURVE	CHORD BEARING	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 47°55' W	27.66'	23.99'	17.92'
C2	N 63°53' W	38.05'	278.26'	38.08'
C3	N 63°41' W	65.74'	205.68'	65.03'
C4	N 42°40' W	167.35'	1251.87'	167.50'
C5	N 36°43' W	344.17'	3534.47'	344.31'

- (+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS NOTES
- 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.
  - BOUNDARIES ALONG ROADWAYS ARE BASED UPON MEMORANDUM BY DICKIE, MCCAMEY & CHILCOTE, P.C. FILE 0058304.0401147

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

*David L Jackson*



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

DRAWING NUMBER MICHTER\_N-2HM\_REV2

SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING  
GRADE GPS



JACKSON SURVEYING INC.  
P.O. Box 1480  
Clarksburg, WV 26302  
304-623-5851

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

DATE: SEPTEMBER 27, 2019

REVISED: OCTOBER 08, 2019

OPERATORS WELL NO. MICHTER N-2HM

API WELL NO. 47-051-02276

STATE WV COUNTY MARSHALL PERMIT 47-051-02276

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

LOCATION ELEVATION 1127.11' 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, ET AL ACREAGE 34.405

OIL & GAS ROYALTY OWNER LARRY W. DUNLAP, ET AL LEASE ACREAGE 34.405

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

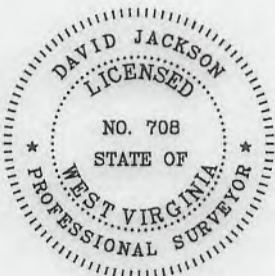
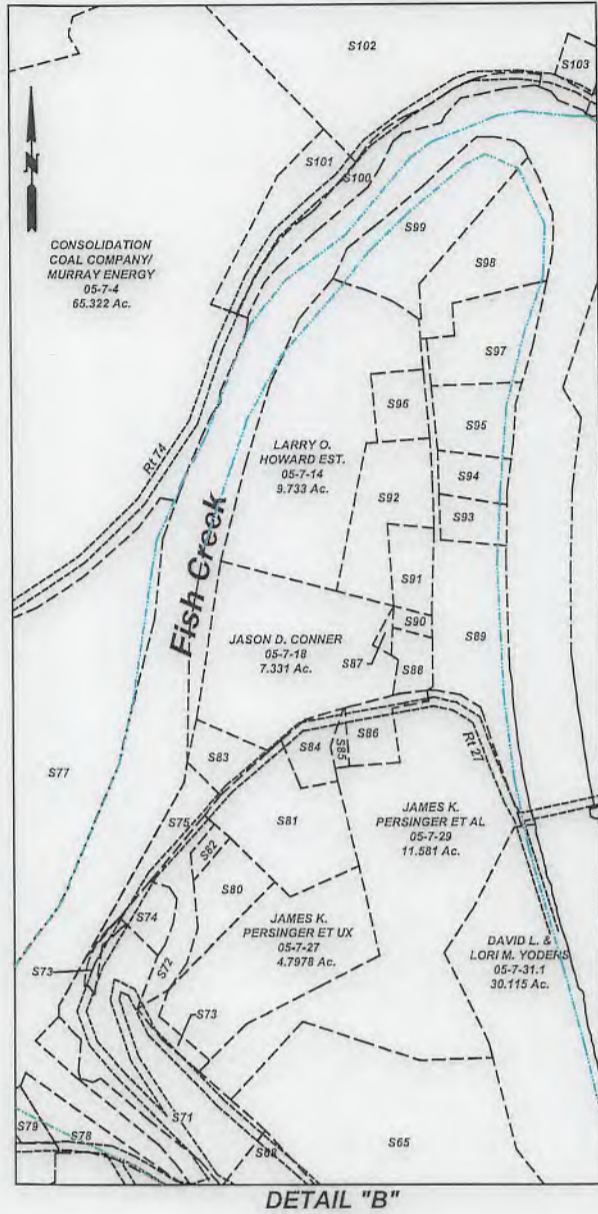
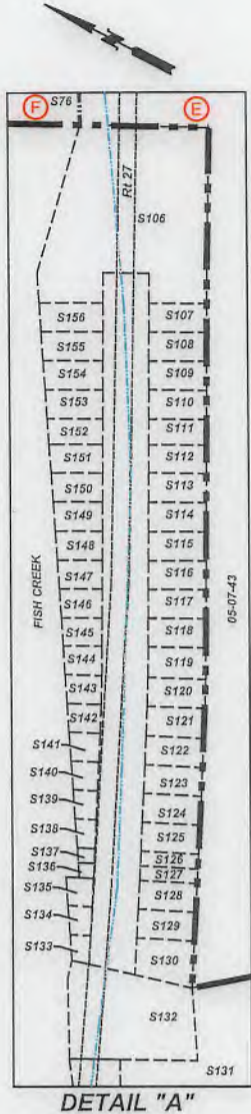
TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6,411' TMD: 13,832'

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 MICTHER LEASE  
WELL N-2HM  
490.9478± ACRES



P.S. 708 *David L Jackson*



**TUG HILL**  
OPERATING

OPERATOR'S  
WELL #: Michter N-2HM  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV  
API #: 47-051-02276

WELL PLAT  
PAGE 2 OF 3  
DATE: 09/27/2019  
REVISED; 10/08/19

**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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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 

Its: Permitting Specialist - Appalachia Region

Environmental Protection

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment				
10*47051.089	5-11-1.1	A	LARRY W DUNLAP AND BARBARA E DUNLAP	TH EXPLORATION LLC	1/8+	864	148	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
10*47051.089	5-11-1.4	B	LARRY W DUNLAP AND BARBARA E DUNLAP	TH EXPLORATION LLC	1/8+	864	148	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
10*19154	5-12-9	C	ROBERT H FISH PATSY C FISH	TRIENERGY HOLDINGS, LLC	1/8+	706	631	N/A	N/A	N/A	N/A	TriEnergy Holdings LLC to NPAR LLC: 24/180	TriEnergy Holdings LLC & Development LLC & Radler 2000 LP: 24/466	Chief E&D LLC, Chief O&G LLC, Radler 2000 L.P. & Eberplus Resources (USA) Corp to Chevron USA Inc: 25/1 & USA Inc: 756/332	NPAR LLC to Chevron USA Inc: 28/356	Chevron USA Inc to TH Exploration LLC: 40/127			
10*16914	5-7-39	D	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	976	620	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
041112	5-7-43	E	COLUMBIAN CHEMICALS COMPANY	CNX LAND RESOURCES INC	1/8+	691	363	N/A	N/A	N/A	N/A	CNX Land Resources Inc to CNX Gas Company LLC: 745/117	CNX Gas Company to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/64	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Noble Energy Inc to HG Energy II Appalachia LLC: 34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286		
0091960000	Fish Creek - State of WV	F	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	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286			
10*27550	5-7-3.3	G	CERTAINTED GYPSUM WEST VIRGINIA INC. ET AL	TH EXPLORATION LLC	1/8+	Pending	Pending	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
624061	5-7-3.4	H	LOUCKS CHARLES H; KEISTER, FENTON O, JR, ET AL	CONSOLIDATION COAL COMPANY	1/8+	273	326	N/A	N/A	N/A	N/A	Consolidation Coal Company 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	Noble Energy Inc to HG Energy II Appalachia LLC: 34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286		
624061	5-7-3	I	LOUCKS CHARLES H; KEISTER, FENTON O, JR, ET AL	CONSOLIDATION COAL COMPANY	1/8+	273	326	N/A	N/A	N/A	N/A	Consolidation Coal Company 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	Noble Energy Inc to HG Energy II Appalachia LLC: 34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286		
624074	5-7-3	I	GATTS, ALICE	THE M. A. HANNA COMPANY	1/8+	282	394	N/A	N/A	N/A	N/A	Consolidation Coal Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Consolidation Coal Company: 387/363	Pittsburgh Consolidation Coal Company: 387/363	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	Noble Energy Inc to HG Energy II Appalachia LLC: 34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
0095360000	5-7-3	I	CSX TRANSPORTATION INC	NOBLE ENERGY INC	1/8+	879	251	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286			
624061	5-7-2	I	LOUCKS CHARLES H; KEISTER, FENTON O, JR, ET AL	CONSOLIDATION COAL COMPANY	1/8+	273	326	N/A	N/A	N/A	N/A	Consolidation Coal Company 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	Noble Energy Inc to HG Energy II Appalachia LLC: 34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286		

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
624074	5-7-2	1	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	Pittsburgh 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	909/94	931/43	34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624081	5-7-2	1	COX, HANNAH O & J FRANK	CONSOLIDATION COAL COMPANY	1/8+	290	110	N/A	N/A	N/A	Consolidation Coal Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	909/94	931/43	34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
0088417004	5-7-2	1	IDA L CAMPBELL	NOBLE ENERGY INC	1/8+	859	496	N/A	N/A	N/A	N/A	N/A	N/A	39/1	34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
0095360000	5-7-2	1	CSX TRANSPORTATION INC	NOBLE ENERGY INC	1/8+	879	251	N/A	N/A	N/A	N/A	N/A	N/A	39/1	34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624061	5-7-3.1	1	LOUCKS, CHARLES H; KEISTER, FENTON O, JR, ET AL	CONSOLIDATION COAL COMPANY	1/8+	273	326	N/A	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal	Pittsburgh Consolidation Coal Company: 387/363	Consolidation Coal Company et al to CNX Gas Company LLC: 646/493	CNX Gas Company LLC to Noble Energy Inc: 752/66	909/94	931/43	34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
624074	5-7-3.1	1	GATTS, ALICE	THE M. A. HANNA COMPANY	1/8+	282	394	Company: 315/417	Name Change: Pittsburgh Consolidation Coal Company to Pittsburgh Consolidation Coal	Pittsburgh 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	909/94	931/43	34/392	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
0095360000	5-7-3.1	1	CSX TRANSPORTATION INC	NOBLE ENERGY INC	1/8+	879	251	N/A	N/A	N/A	N/A	Noble Energy Inc to CNX Gas Company LLC: 37/169	37/169	39/1	34/392	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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MICHAEL MORAN  
BRIGHTON RESOURCES  
5851 ELLSWORTH AVENUE, #1  
PITTSBURGH PA 15232-1707

BOOK 0040 PAGE 0127

STATE OF WEST VIRGINIA §  
§  
COUNTY OF MARSHALL §

Marshall County  
Jan Pest, Clerk  
Instrument 1428356  
08/16/2017 @ 12:08:49 PM  
ASSIGNMENTS  
Book 40 @ Page 127  
Pages Recorded 25  
Recording Cost \$ 33.00

**ASSIGNMENT AND CONVEYANCE**

**THIS ASSIGNMENT AND CONVEYANCE** (the "**Assignment**") is made and entered into this 1 day of AUGUST, 2017 (the "**Effective Date**"), by and between **CHEVRON U.S.A. INC.** (hereinafter "**Assignor**") and **TH EXPLORATION, LLC** (hereinafter "**Assignee**") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated the 1st day of August, 2017 (the "**Acreage Trade Agreement**"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

**WITNESSETH:**

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

**WHEREAS**, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases as described below, subject to certain overriding royalty interests and less and except certain exclusions.

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

1. **Assignment.** Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon, except that Assignor excepts and reserves from this Assignment the following:

A. The Chevron ORRI previously conveyed to Assignor and as described in that certain Memorandum of Assignment of Oil and Gas Lease Interests dated November 6, 2012 by and between Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia, and

B. As to each of the Leases and all oil, gas, and associated hydrocarbons produced, saved and sold thereunder, an overriding royalty interest equal to the difference between 82% and the

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# TUG HILL

September 24, 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-2HM

Subject: Marshall County Route 27 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 in the area reflected on the Michter N-2HM 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,

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: 09/24/2019

API No. 47- 051 -  
Operator's Well No. Michter N-2HM  
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>517,339.29</u>
County:	<u>Marshall</u>		Northing:	<u>4,405,906.58</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Rinos 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: 100px;"><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><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 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.

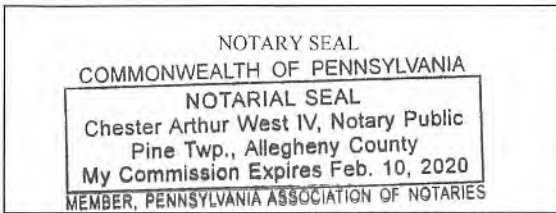
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**Certification of Notice is hereby given:**

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 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-hill.com</u>



Subscribed and sworn before me this 24<sup>th</sup> day of September 2019  
*[Signature]* Notary Public  
 My Commission Expires 2-10-2020

**Oil and Gas Privacy Notice:**

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

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WW-6A  
(9-13)

4705102276  
API NO: 47-051-  
OPERATOR WELL NO. Michter N-2HM  
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:** 9/6/2019 **Date Permit Application Filed:** 9/11/2019

**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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RECEIVED  
Office of Oil and GasAPI NO. 47- 051 -  
OPERATOR WELL NO. Michter N-2HM  
Well Pad Name: Michter

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WV Department of  
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(8-13)**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

**Well Location Restrictions**

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

OCT 02 2019

WW-6A  
(8-13)

API NO. 47-051 -  
OPERATOR WELL NO. Michter N-2HM

WV Department of  
Environmental Protection Well Pad Name: Michter

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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WV Department of  
Environmental Protection

WW-6A  
(8-13)

API NO. 47- 051 - \_\_\_\_\_  
OPERATOR WELL NO. Michter N-2HM  
Well Pad Name: Michter

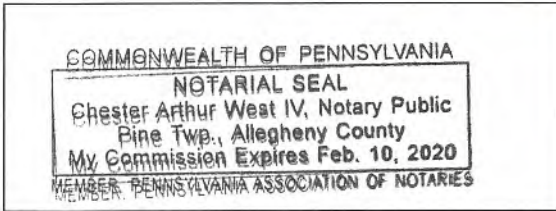
**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 6<sup>th</sup> day of Sept., 2019.

*[Signature]* Notary Public

My Commission Expires 2-10-2020

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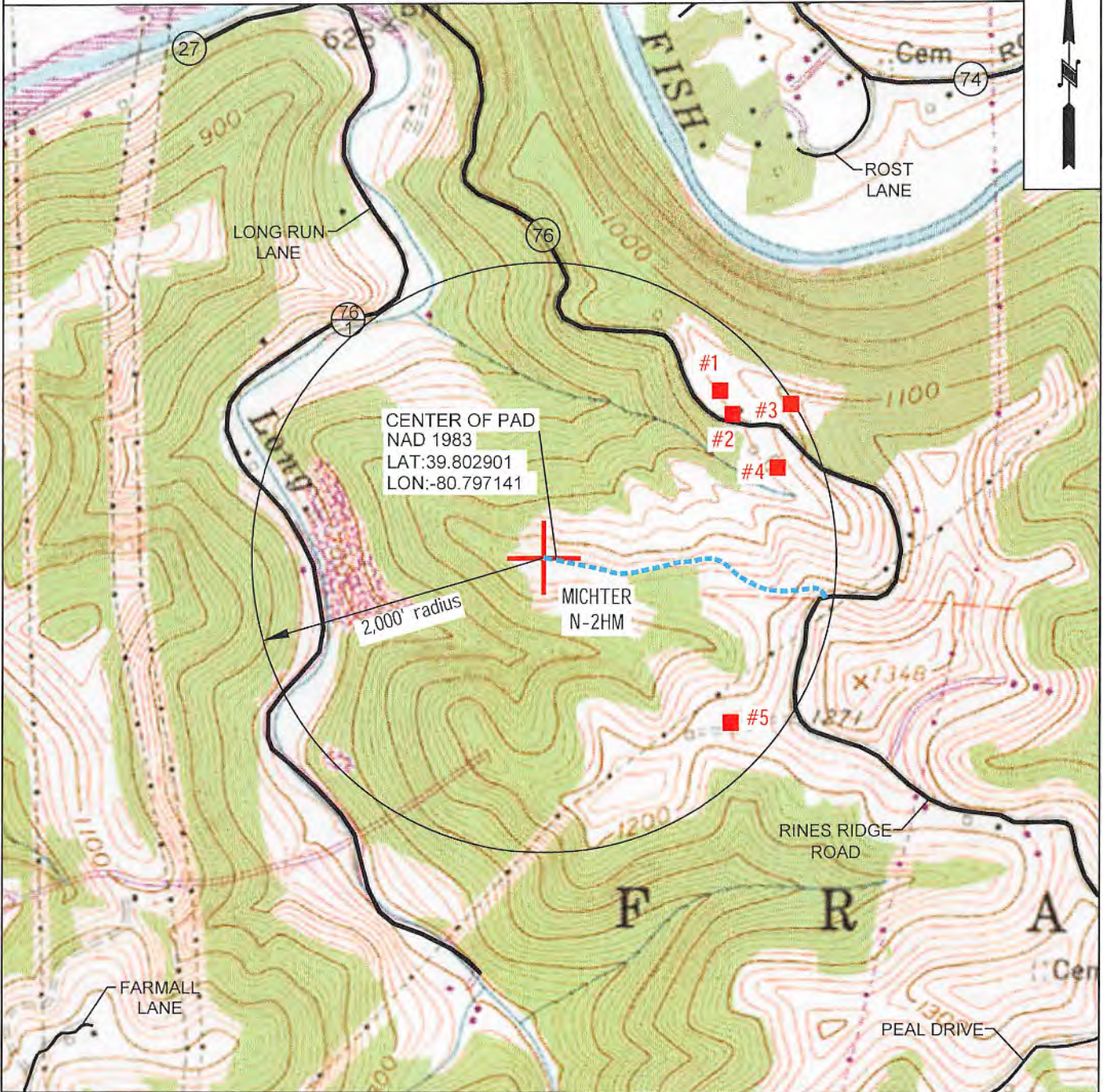
OCT 02 2019

WW-6A

**PROPOSED** WV Department of Environmental Protection  
**MICHTER N-2HM**

SUPPLEMENT PG 1

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



**TUG HILL**  
**OPERATING**

**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**  
MICHTER  
**DATE:**  
DATE: 08-26-2019



WW-6A

Supplement Pg. 1A

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

## WATER WELL REPORT

Well: MICHTER N-2HM  
 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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WV Department of  
 Environmental Protection

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:** 5/8/2018 **Date of Planned Entry:** 5/15/2018

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

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

WV Department of Environmental Protection

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

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

**Notice is hereby given by:**

Well Operator:	Tug Hill Operating, LLC	Address:	380 Southpointe Boulevard, Plaza II, Suite 200
Telephone:	724-749-8388		Canonsburg, PA 15317
Email:	amiller@tug-hillop.com	Facsimile:	724-338-2030

**Oil and Gas Privacy Notice:**

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

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WW-6A3 NOTICE OF ENTRY FOR PLAT SURVEY

ATTACHMENT #1

WELL: MICHTER N-2HM

Mineral Owners (Well Pad)

Charles Leroy Dunlap ✓  
2500 Ohio St. 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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WV Department of  
Environmental Protection

WW-6A5  
(1/12)

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

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

**Date of Notice:** 09/10/2019      **Date Permit Application Filed:** 09/27/2019

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

CERTIFIED MAIL                                       HAND  
RETURN RECEIPT REQUESTED                                      DELIVERY

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

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

Name: 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 (Pad and Access Road)  
Address: 100 Orchard Lane  
Moundsville, WV 26041 \*See attachment

**Notice is hereby given:**

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

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>517,339.29</u>
County:	<u>Marshall</u>		Northing:	<u>4,405,906.58</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 &amp; Charles Leroy Dunlap</u>	
Watershed:	<u>Fish Creek</u>			

**This Notice Shall Include:**

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

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

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

**Oil and Gas Privacy Notice:**

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

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**WW-6A5 Attachment  
Michter N-2HM**

**Additional Landowner**

Charles Leroy Dunlap  
21 Gypsy Drive  
Moundsville, WV 26041

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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

**Byrd E. White, III**  
Secretary of Transportation/  
Commissioner of Highways

**September 23, 2019**

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

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

Subject: DOH Permit for the Mitcher Well Pad, Marshall County  
Mitcher N-2HM Well Site

Dear Mr. Martin,

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

This operator is in compliance with §22-6A-20 of the WV Code. 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 October 1, 2018.

Very Truly Yours,

A handwritten signature in blue ink that reads "Gary K. Clayton".

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

Cc: Amy Miller  
Tug Hill Operating  
CH, OM, D-6  
File

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

Well No. Michter N-2HM

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

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