



west virginia department of environmental protection

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

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

Monday, March 11, 2019
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for WOODFORD 8HU
47-051-02149-00-00

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: WOODFORD 8HU
Farm Name: CNX RCPC, LLC
U.S. WELL NUMBER: 47-051-02149-00-00
Horizontal 6A New Drill
Date Issued: 3/11/2019

PERMIT CONDITIONS

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

CONDITIONS

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

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.



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

Barry K. Lay, Chairman
dep.wv.gov

February 15, 2019

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

RE: Application for Deep Well Permit – API #47-051-02149

COMPANY: Tug Hill Operating, LLC

FARM: CNX Land, LLC Woodford 8HU

COUNTY: Marshall DISTRICT: Franklin QUAD: Powhatan Point

The deep well review of the application for the above company is Approved to drill to Trenton for Point Pleasant completion.

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

1. Comments to Notice of Deviation filed? No
2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: yes; 47-051-02143; 47-051-02147, 47-051-02150, 47-051-02152
4. Provided a plat showing that the proposed location is a distance of 400+ feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

Susan Rose
Administrator

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 Powhatan Point 7
Operator ID County District Quadrangle

2) Operator's Well Number: Woodford 8HU Well Pad Name: Woodford

3) Farm Name/Surface Owner: CNX Land, LLC Public Road Access: Burch Ridge Road (County Route 29)

4) Elevation, current ground: 1250' Elevation, proposed post-construction: 1233.51'

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

(b) If Gas Shallow Deep
Horizontal

6) Existing Pad: Yes or No No

ju
1/7/19

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Point Pleasant is the target formation at a depth of 11,152' - 10,880' - thickness of 122' and anticipated pressure of approx. 9500 psi.

8) Proposed Total Vertical Depth: 11,152'

9) Formation at Total Vertical Depth: Trenton

10) Proposed Total Measured Depth: 18,817'

11) Proposed Horizontal Leg Length: 7,251.36'

12) Approximate Fresh Water Strata Depths: 70' ; 805'

13) Method to Determine Fresh Water Depths: Offset well reports or noticeable flow at the flowline or when need to start soaping

14) Approximate Saltwater Depths: 2,167'

15) Approximate Coal Seam Depths: Sewickley Coal - 701' ; Pittsburgh Coal - 799'

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

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

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

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259FT^3(CTS)
Fresh Water	20"	NEW	J55	106.5#	905'	905'	1,470FT^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	2700'	2700'	1,905FT^3(CTS)
Intermediate	9 5/8"	NEW	HPP110	47#	10,032'	10,032'	3,276FT^3(CTS)
Production	5 1/2"	NEW	P110	23#	18,817'	18,817'	4,481FT^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		10,763'	
Liners							

Joe
11/21/18

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	20"	26"	.5	2,410	1,928	SEE # 24	1.2
Coal	13 3/8"	17 1/2"	.38	2,740	2,192	SEE #24	1.2
Intermediate	9 5/8"	12 1/4"	.472	10,730	6,968	SEE #24	1.99
Production	5 1/2"	8 1/2"	.415	16,510	10,864	SEE #24	1.18
Tubing	2 7/8"			11,385	11,624		
Liners							

PACKERS

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

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JW
11/21/18

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

Drill through the Point Pleasant and TD Pilot Hole 150' into the Trenton. Log vertical section and run a solid cement plug back to proposed KOP. Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

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

Well to be completed with approximately 18,125,000 lb proppant and 280,226 bbl of water. Max rate = 80 bpm; max psi = 12,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 44.34 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.01 acres

23) Describe centralizer placement for each casing string:

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

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

*See Attachment

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

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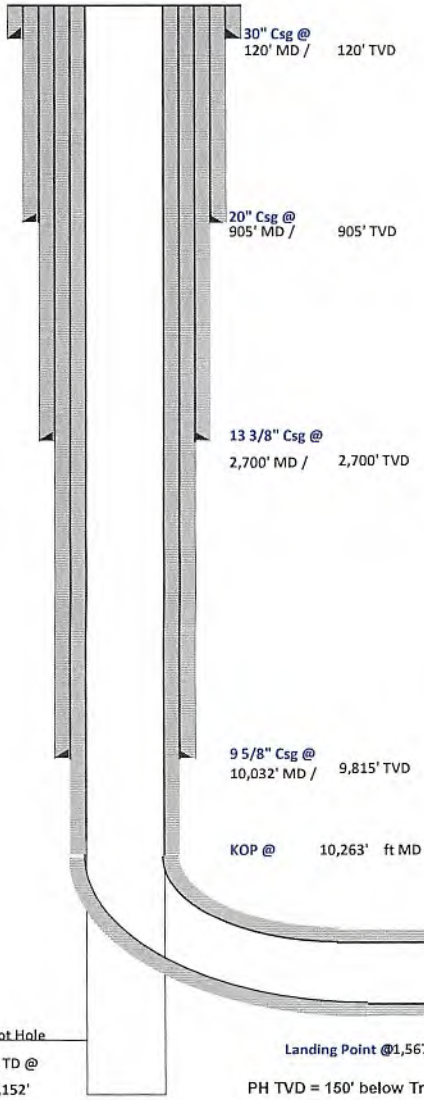


WELL NAME: Woodford-8HU
 STATE: WV COUNTY: Marshall
 DISTRICT: Franklin
 DF Elev: 1,235' GL Elev: 1,235'
 TD: 18,817'
 TH Latitude: 39.80424078
 TH Longitude: -80.81196578
 BH Latitude: 39.7895561
 BH Longitude: 80.80066532

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	805'
Sewickley Coal	701'
Pittsburgh Coal	799'
Big Lime	2,082'
Berea	2,596'
Tully	6,254'
Marcellus	6,315'
Onondaga	6,369'
Salina	7,043'
Lockport	8,044'
Utica	10,642'
Point Pleasant	10,880'
Landing Depth	10,942'
Trenton	11,002'
Pilot Hole TD	11,152'

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	26	20	905'	905'	106.5	J55	Surface
Intermediate 1	17 1/2	13 3/8	2,700'	2,700'	54.5	J55	Surface
Intermediate 2	12 1/4	9 5/8	10,032'	9,815'	47	HPP110	Surface
Production	8 1/2	5 1/2	18,817'	11,069'	23	HCP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,585	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	2,064	A	15	Air	1 Centralizer every other jt
Intermediate 2	2,705	A	14.5	Air	1 Centralizer every other jt
Production	3,854	A	15	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



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Handwritten signature and date: 11/21/18

Lateral TD @ 18,817' ft MD
 11,069' ft TVD

Landing Point @ 1,567' MD / 10,942' TVD
 PH TVD = 150' below Trenton Top

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Tug Hill Operating, LLC Casing and Cement Program

Woodford-8HU

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	20"	J55	26"	905'	CTS
Intermediate 1	13 3/8"	J55	17 1/2"	2,700'	CTS
Intermediate 2	9 5/8"	HPP110	12 1/4"	10,032'	CTS
Production	5 1/2"	HCP110	8 1/2"	18,817'	CTS

Cement

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

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

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

Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.18

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

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

Data Sources Reviewed:

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

Contacted Devin Ducoeur 724-705-0444, dducoeur@dpslandservices.com DPS GIS (7/2/2018) 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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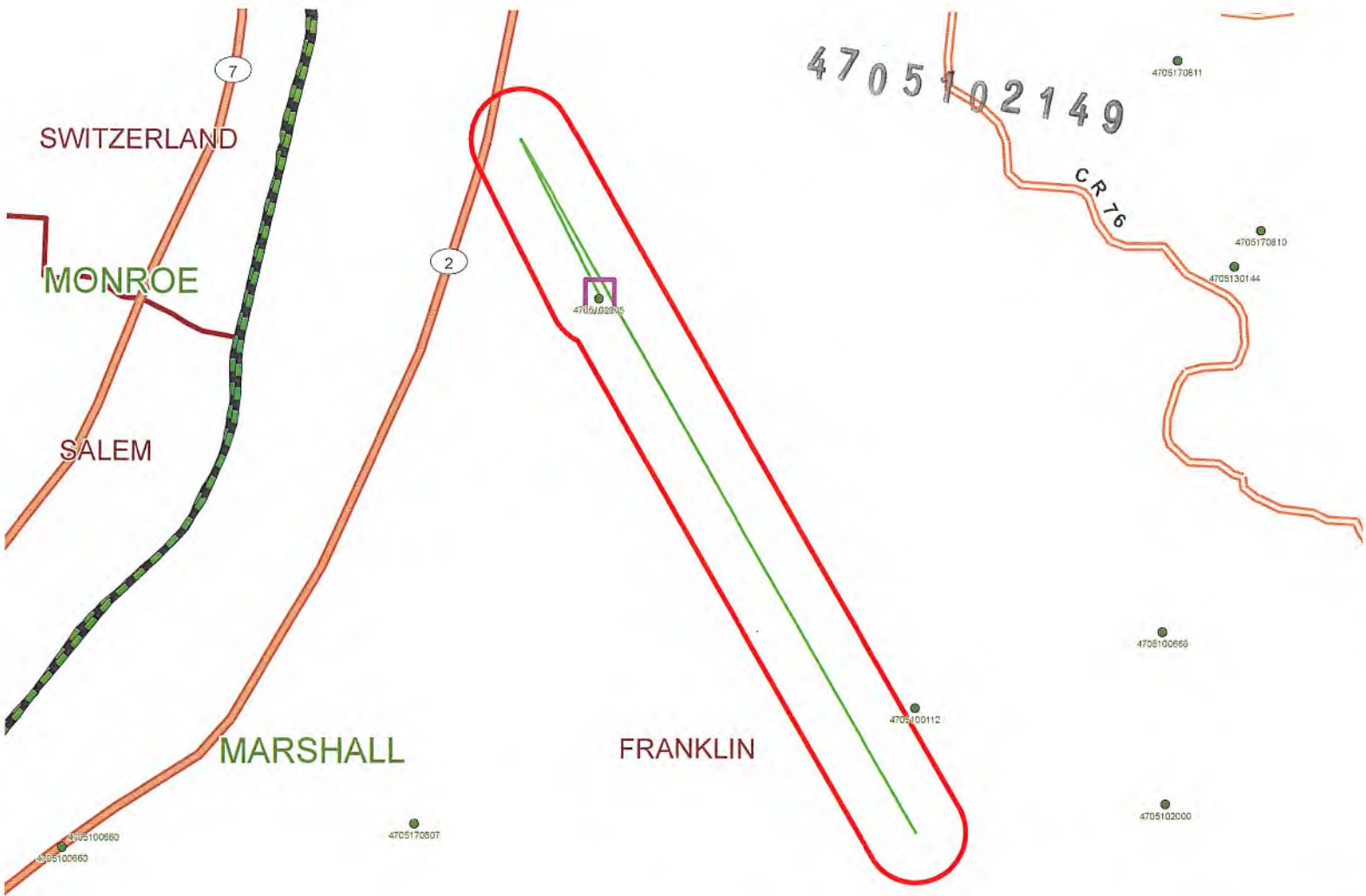
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Permit well - Woodford-8HU
 Wells within 500' Buffer

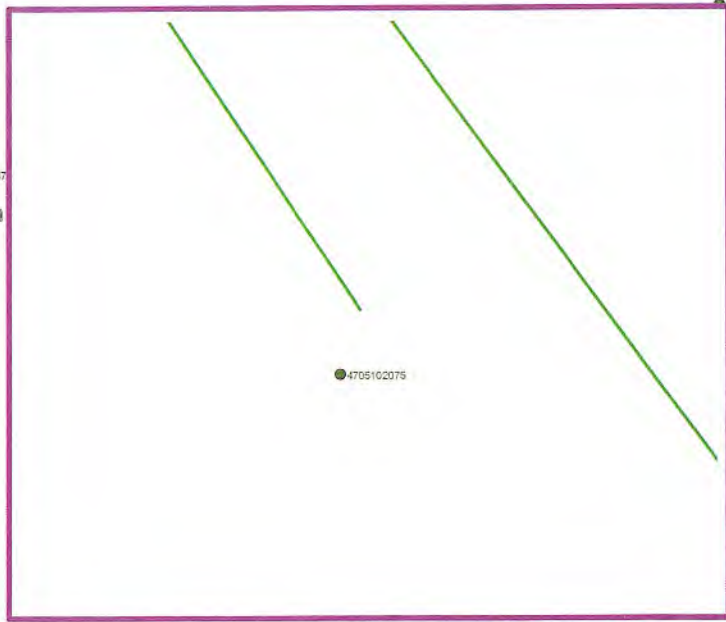
Note: Well spots depicted on Area of Review map (page 3) are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots

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
None	N/A	N/A	N/A	N/A	N/A	N/A

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- Legend**
- Well Locations (ims.wvgs.wvnet.edu)
 - Major Highways
 - Major Roads
 - Woodford - 8HU
 - 500 Ft. Buffer
 - ▭ Counties
 - ▭ Districts



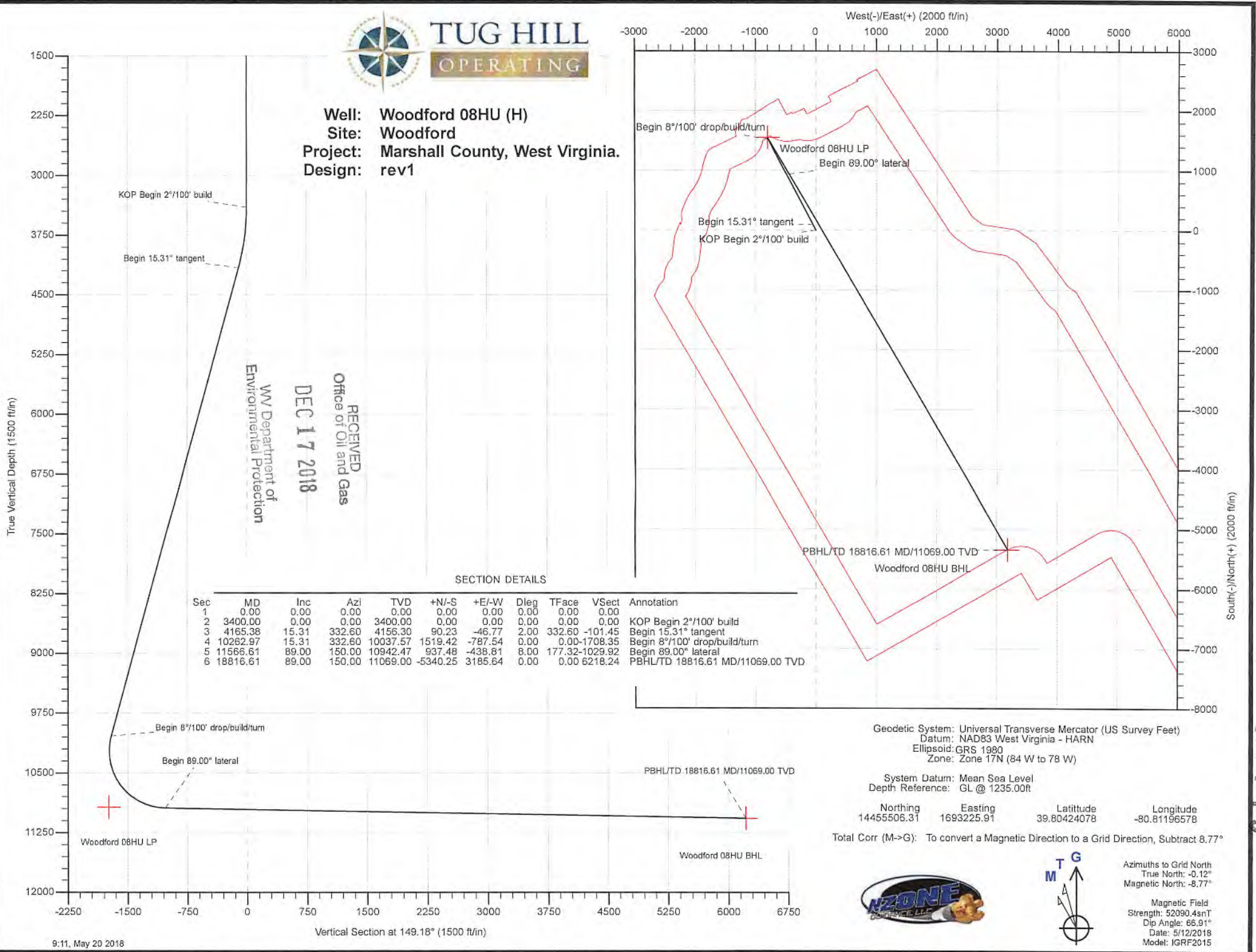
Woodford - 8HU Franklin District Marshall County, WV





TUG HILL
OPERATING

Well: Woodford 08HU (H)
Site: Woodford
Project: Marshall County, West Virginia.
Design: rev1



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SECTION DETAILS

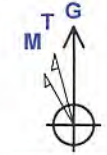
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	3400.00	0.00	0.00	3400.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	4165.38	15.31	332.60	4156.30	90.23	-46.77	2.00	332.60	-101.45	Begin 15.31° tangent
4	10262.97	15.31	332.60	10037.57	1519.42	-787.54	0.00	0.00	-1708.35	Begin 8°/100' drop/build/turn
5	11566.61	89.00	150.00	10942.47	937.48	-438.81	8.00	177.32	-1029.92	Begin 89.00° lateral
6	18816.61	89.00	150.00	11069.00	-5340.25	3185.64	0.00	0.00	6218.24	PBHL/TD 18816.61 MD/11069.00 TVD

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

System Datum: Mean Sea Level
Depth Reference: GL @ 1235.00ft

Northing 14455506.31 Easting 1693225.91 Latitude 39.60424078 Longitude -80.81196578

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.77°



Azimuths to Grid North
True North: -0.12°
Magnetic North: -8.77°

Magnetic Field
Strength: 52090.4nT
Dip Angle: 66.91°
Date: 5/12/2018
Model: IGRF2015

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Planning Report - Geographic 4705102149

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 08HU (H)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1235.00ft
Project:	Marshall County, West Virginia.	MD Reference:	GL @ 1235.00ft
Site:	Woodford	North Reference:	Grid
Well:	Woodford 08HU (H)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

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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)		

WV Department of Environmental Protection

Site	Woodford				
Site Position:		Northing:	14,455,471.78 usft	Latitude:	39.80414597
From:	Lat/Long	Easting:	1,693,217.70 usft	Longitude:	-80.81199526
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	Woodford 08HU (H)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,506.32 usft	Latitude:	39.80424078
	+E/-W	0.00 ft	Easting:	1,693,225.91 usft	Longitude:	-80.81196578
Position Uncertainty	0.00 ft	Wellhead Elevation:		Ground Level:	1,235.00 ft	

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/12/2018	-8.65	66.91	52,090.35645126

Design	rev1			
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	149.18

Plan Survey Tool Program	Date	5/19/2018		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	18,816.61 rev1 (Original Hole)	MWD	MWD - Standard

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	0.00	
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,165.38	15.31	332.60	4,156.30	90.23	-46.77	2.00	2.00	0.00	332.60	
10,262.97	15.31	332.60	10,037.57	1,519.42	-787.54	0.00	0.00	0.00	0.00	
11,566.61	89.00	150.00	10,942.47	937.48	-438.81	8.00	5.65	13.61	177.32	
18,816.61	89.00	150.00	11,069.00	-5,340.25	3,185.64	0.00	0.00	0.00	0.00	Woodford 08HU BHL



Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia.
 Site: Woodford
 Well: Woodford 08HU (H)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Woodford 08HU (H)
 TVD Reference: GL @ 1235.00ft
 MD Reference: GL @ 1235.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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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	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
100.00	0.00	0.00	100.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
200.00	0.00	0.00	200.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
300.00	0.00	0.00	300.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
400.00	0.00	0.00	400.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
500.00	0.00	0.00	500.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
600.00	0.00	0.00	600.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
700.00	0.00	0.00	700.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
800.00	0.00	0.00	800.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
900.00	0.00	0.00	900.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,500.00	0.00	0.00	2,500.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,600.00	0.00	0.00	2,600.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,700.00	0.00	0.00	2,700.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,800.00	0.00	0.00	2,800.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
2,900.00	0.00	0.00	2,900.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
3,000.00	0.00	0.00	3,000.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
3,100.00	0.00	0.00	3,100.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
3,200.00	0.00	0.00	3,200.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
3,300.00	0.00	0.00	3,300.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
3,400.00	0.00	0.00	3,400.00	0.00	0.00	14,455,506.32	1,693,225.91	39.80424078	-80.81196578
KOP Begin 2°/100' build									
3,500.00	2.00	332.60	3,499.98	1.55	-0.80	14,455,507.87	1,693,225.11	39.80424504	-80.81196863
3,600.00	4.00	332.60	3,599.84	6.20	-3.21	14,455,512.51	1,693,222.70	39.80425782	-80.81197717
3,700.00	6.00	332.60	3,699.45	13.93	-7.22	14,455,520.25	1,693,218.69	39.80427909	-80.81199139
3,800.00	8.00	332.60	3,798.70	24.75	-12.83	14,455,531.07	1,693,213.08	39.80430883	-80.81201128
3,900.00	10.00	332.60	3,897.47	38.64	-20.03	14,455,544.96	1,693,205.88	39.80434701	-80.81203680
4,000.00	12.00	332.60	3,995.62	55.58	-28.81	14,455,561.90	1,693,197.10	39.80439359	-80.81206794
4,100.00	14.00	332.60	4,093.06	75.55	-39.16	14,455,581.87	1,693,186.75	39.80444849	-80.81210465
4,165.38	15.31	332.60	4,156.31	90.24	-46.77	14,455,596.55	1,693,179.14	39.80448886	-80.81213164
Begin 15.31° tangent									
4,200.00	15.31	332.60	4,189.70	98.35	-50.98	14,455,604.67	1,693,174.93	39.80451117	-80.81214655
4,300.00	15.31	332.60	4,286.15	121.79	-63.12	14,455,628.10	1,693,162.78	39.80457561	-80.81218963
4,400.00	15.31	332.60	4,382.60	145.23	-75.27	14,455,651.54	1,693,150.63	39.80464005	-80.81223272
4,500.00	15.31	332.60	4,479.06	168.67	-87.42	14,455,674.98	1,693,138.49	39.80470449	-80.81227580
4,600.00	15.31	332.60	4,575.51	192.10	-99.57	14,455,698.42	1,693,126.34	39.80476892	-80.81231888
4,700.00	15.31	332.60	4,671.96	215.54	-111.72	14,455,721.86	1,693,114.19	39.80483336	-80.81236196
4,800.00	15.31	332.60	4,768.41	238.98	-123.87	14,455,745.30	1,693,102.04	39.80489780	-80.81240504
4,900.00	15.31	332.60	4,864.87	262.42	-136.02	14,455,768.74	1,693,089.89	39.80496224	-80.81244812
5,000.00	15.31	332.60	4,961.32	285.86	-148.17	14,455,792.17	1,693,077.74	39.80502668	-80.81249121



Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia.
 Site: Woodford
 Well: Woodford 08HU (H)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Woodford 08HU (H)
 TVD Reference: GL @ 1235.00ft
 MD Reference: GL @ 1235.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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WV Department of
 Environmental Protection

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,100.00	15.31	332.60	5,057.77	309.30	-160.31	14,455,815.61	1,693,065.59	39.80509112	-80.81253429	
5,200.00	15.31	332.60	5,154.22	332.74	-172.46	14,455,839.05	1,693,053.45	39.80515556	-80.81257737	
5,300.00	15.31	332.60	5,250.67	356.17	-184.61	14,455,862.49	1,693,041.30	39.80521999	-80.81262045	
5,400.00	15.31	332.60	5,347.13	379.61	-196.76	14,455,885.93	1,693,029.15	39.80528443	-80.81266354	
5,500.00	15.31	332.60	5,443.58	403.05	-208.91	14,455,909.37	1,693,017.00	39.80534887	-80.81270662	
5,600.00	15.31	332.60	5,540.03	426.49	-221.06	14,455,932.81	1,693,004.85	39.80541331	-80.81274970	
5,700.00	15.31	332.60	5,636.48	449.93	-233.21	14,455,956.24	1,692,992.70	39.80547775	-80.81279278	
5,800.00	15.31	332.60	5,732.94	473.37	-245.35	14,455,979.68	1,692,980.55	39.80554219	-80.81283587	
5,900.00	15.31	332.60	5,829.39	496.81	-257.50	14,456,003.12	1,692,968.41	39.80560662	-80.81287895	
6,000.00	15.31	332.60	5,925.84	520.24	-269.65	14,456,026.56	1,692,956.26	39.80567106	-80.81292203	
6,100.00	15.31	332.60	6,022.29	543.68	-281.80	14,456,050.00	1,692,944.11	39.80573550	-80.81296511	
6,200.00	15.31	332.60	6,118.74	567.12	-293.95	14,456,073.44	1,692,931.96	39.80579994	-80.81300820	
6,300.00	15.31	332.60	6,215.20	590.56	-306.10	14,456,096.88	1,692,919.81	39.80586438	-80.81305128	
6,400.00	15.31	332.60	6,311.65	614.00	-318.25	14,456,120.31	1,692,907.66	39.80592882	-80.81309436	
6,500.00	15.31	332.60	6,408.10	637.44	-330.39	14,456,143.75	1,692,895.51	39.80599325	-80.81313745	
6,600.00	15.31	332.60	6,504.55	660.88	-342.54	14,456,167.19	1,692,883.37	39.80605769	-80.81318053	
6,700.00	15.31	332.60	6,601.01	684.31	-354.69	14,456,190.63	1,692,871.22	39.80612213	-80.81322361	
6,800.00	15.31	332.60	6,697.46	707.75	-366.84	14,456,214.07	1,692,859.07	39.80618657	-80.81326670	
6,900.00	15.31	332.60	6,793.91	731.19	-378.99	14,456,237.51	1,692,846.92	39.80625101	-80.81330978	
7,000.00	15.31	332.60	6,890.36	754.63	-391.14	14,456,260.94	1,692,834.77	39.80631545	-80.81335286	
7,100.00	15.31	332.60	6,986.82	778.07	-403.29	14,456,284.38	1,692,822.62	39.80637988	-80.81339595	
7,200.00	15.31	332.60	7,083.27	801.51	-415.43	14,456,307.82	1,692,810.47	39.80644432	-80.81343903	
7,300.00	15.31	332.60	7,179.72	824.95	-427.58	14,456,331.26	1,692,798.33	39.80650876	-80.81348212	
7,400.00	15.31	332.60	7,276.17	848.38	-439.73	14,456,354.70	1,692,786.18	39.80657320	-80.81352520	
7,500.00	15.31	332.60	7,372.62	871.82	-451.88	14,456,378.14	1,692,774.03	39.80663764	-80.81356828	
7,600.00	15.31	332.60	7,469.08	895.26	-464.03	14,456,401.58	1,692,761.88	39.80670207	-80.81361137	
7,700.00	15.31	332.60	7,565.53	918.70	-476.18	14,456,425.01	1,692,749.73	39.80676651	-80.81365445	
7,800.00	15.31	332.60	7,661.98	942.14	-488.33	14,456,448.45	1,692,737.58	39.80683095	-80.81369754	
7,900.00	15.31	332.60	7,758.43	965.58	-500.47	14,456,471.89	1,692,725.43	39.80689539	-80.81374062	
8,000.00	15.31	332.60	7,854.89	989.02	-512.62	14,456,495.33	1,692,713.29	39.80695983	-80.81378370	
8,100.00	15.31	332.60	7,951.34	1,012.45	-524.77	14,456,518.77	1,692,701.14	39.80702426	-80.81382679	
8,200.00	15.31	332.60	8,047.79	1,035.89	-536.92	14,456,542.21	1,692,688.99	39.80708870	-80.81386987	
8,300.00	15.31	332.60	8,144.24	1,059.33	-549.07	14,456,565.65	1,692,676.84	39.80715314	-80.81391296	
8,400.00	15.31	332.60	8,240.70	1,082.77	-561.22	14,456,589.08	1,692,664.69	39.80721758	-80.81395604	
8,500.00	15.31	332.60	8,337.15	1,106.21	-573.37	14,456,612.52	1,692,652.54	39.80728202	-80.81399913	
8,600.00	15.31	332.60	8,433.60	1,129.65	-585.52	14,456,635.96	1,692,640.39	39.80734645	-80.81404221	
8,700.00	15.31	332.60	8,530.05	1,153.09	-597.66	14,456,659.40	1,692,628.25	39.80741089	-80.81408530	
8,800.00	15.31	332.60	8,626.50	1,176.52	-609.81	14,456,682.84	1,692,616.10	39.80747533	-80.81412838	
8,900.00	15.31	332.60	8,722.96	1,199.96	-621.96	14,456,706.28	1,692,603.95	39.80753977	-80.81417147	
9,000.00	15.31	332.60	8,819.41	1,223.40	-634.11	14,456,729.72	1,692,591.80	39.80760421	-80.81421455	
9,100.00	15.31	332.60	8,915.86	1,246.84	-646.26	14,456,753.15	1,692,579.65	39.80766864	-80.81425764	
9,200.00	15.31	332.60	9,012.31	1,270.28	-658.41	14,456,776.59	1,692,567.50	39.80773308	-80.81430072	
9,300.00	15.31	332.60	9,108.77	1,293.72	-670.56	14,456,800.03	1,692,555.35	39.80779752	-80.81434381	
9,400.00	15.31	332.60	9,205.22	1,317.16	-682.70	14,456,823.47	1,692,543.21	39.80786196	-80.81438690	
9,500.00	15.31	332.60	9,301.67	1,340.59	-694.85	14,456,846.91	1,692,531.06	39.80792639	-80.81442998	
9,600.00	15.31	332.60	9,398.12	1,364.03	-707.00	14,456,870.35	1,692,518.91	39.80799083	-80.81447307	
9,700.00	15.31	332.60	9,494.57	1,387.47	-719.15	14,456,893.79	1,692,506.76	39.80805527	-80.81451615	
9,800.00	15.31	332.60	9,591.03	1,410.91	-731.30	14,456,917.22	1,692,494.61	39.80811971	-80.81455924	
9,900.00	15.31	332.60	9,687.48	1,434.35	-743.45	14,456,940.66	1,692,482.46	39.80818415	-80.81460232	
10,000.00	15.31	332.60	9,783.93	1,457.79	-755.60	14,456,964.10	1,692,470.31	39.80824858	-80.81464541	
10,100.00	15.31	332.60	9,880.38	1,481.23	-767.74	14,456,987.54	1,692,458.17	39.80831302	-80.81468850	
10,200.00	15.31	332.60	9,976.84	1,504.67	-779.89	14,457,010.98	1,692,446.02	39.80837746	-80.81473158	
10,262.97	15.31	332.60	10,037.57	1,519.42	-787.54	14,457,025.74	1,692,433.37	39.80841803	-80.81475871	

Begin 8"/100' drop/build/turn



Planning Report - Geographic

4705102149

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia.
 Site: Woodford
 Well: Woodford 08HU (H)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Woodford 08HU (H)
 TVD Reference: GL @ 1235.00ft
 MD Reference: GL @ 1235.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,300.00	12.35	333.25	10,073.53	1,527.30	-791.58	14,457,033.61	1,692,434.33	39.80843969	-80.81477301
10,400.00	4.39	339.29	10,172.38	1,540.45	-797.75	14,457,046.76	1,692,428.16	39.80847583	-80.81479491
10,500.00	3.74	139.11	10,272.29	1,541.56	-796.97	14,457,047.88	1,692,428.94	39.80847889	-80.81479211
10,600.00	11.69	146.59	10,371.31	1,530.62	-789.24	14,457,036.94	1,692,436.67	39.80844880	-80.81476468
10,700.00	19.68	148.03	10,467.51	1,507.84	-774.72	14,457,014.15	1,692,451.19	39.80838615	-80.81471314
10,800.00	27.68	148.66	10,559.01	1,473.66	-753.69	14,456,979.97	1,692,472.22	39.80829216	-80.81463851
10,900.00	35.68	149.03	10,644.04	1,428.75	-726.56	14,456,935.06	1,692,499.35	39.80816866	-80.81454223
11,000.00	43.68	149.27	10,720.95	1,373.97	-693.85	14,456,880.29	1,692,532.06	39.80801806	-80.81442618
11,100.00	51.67	149.45	10,788.23	1,310.41	-656.21	14,456,816.72	1,692,569.70	39.80784328	-80.81429261
11,200.00	59.67	149.60	10,844.57	1,239.29	-614.37	14,456,745.60	1,692,611.54	39.80764772	-80.81414414
11,300.00	67.67	149.72	10,888.88	1,162.00	-569.13	14,456,668.31	1,692,656.78	39.80743520	-80.81398364
11,400.00	75.67	149.83	10,920.30	1,080.04	-521.39	14,456,586.35	1,692,704.52	39.80720985	-80.81381424
11,500.00	83.67	149.93	10,938.21	995.01	-472.07	14,456,501.32	1,692,753.84	39.80697605	-80.81363924
11,566.61	89.00	150.00	10,942.47	937.48	-438.81	14,456,443.80	1,692,787.10	39.80681788	-80.81352125
Begin 89.00° lateral									
11,600.00	89.00	150.00	10,943.05	908.57	-422.12	14,456,414.88	1,692,803.79	39.80673838	-80.81346202
11,700.00	89.00	150.00	10,944.80	821.98	-372.12	14,456,328.29	1,692,853.79	39.80650030	-80.81328466
11,800.00	89.00	150.00	10,946.54	735.39	-322.13	14,456,241.70	1,692,903.78	39.80626221	-80.81310729
11,900.00	89.00	150.00	10,948.29	648.80	-272.14	14,456,155.12	1,692,953.77	39.80602413	-80.81292993
12,000.00	89.00	150.00	10,950.03	562.21	-222.15	14,456,068.53	1,693,003.76	39.80578604	-80.81275257
12,100.00	89.00	150.00	10,951.78	475.62	-172.15	14,455,981.94	1,693,053.76	39.80554796	-80.81257520
12,200.00	89.00	150.00	10,953.52	389.03	-122.16	14,455,895.35	1,693,103.75	39.80530987	-80.81239784
12,300.00	89.00	150.00	10,955.27	302.44	-72.17	14,455,808.76	1,693,153.74	39.80507179	-80.81222048
12,400.00	89.00	150.00	10,957.01	215.85	-22.18	14,455,722.17	1,693,203.73	39.80483370	-80.81204313
12,500.00	89.00	150.00	10,958.76	129.26	27.82	14,455,635.58	1,693,253.72	39.80459562	-80.81186577
12,600.00	89.00	150.00	10,960.51	42.68	77.81	14,455,548.99	1,693,303.72	39.80435753	-80.81168841
12,700.00	89.00	150.00	10,962.25	-43.91	127.80	14,455,462.40	1,693,353.71	39.80411944	-80.81151106
12,800.00	89.00	150.00	10,964.00	-130.50	177.79	14,455,375.81	1,693,403.70	39.80388136	-80.81133371
12,900.00	89.00	150.00	10,965.74	-217.09	227.79	14,455,289.22	1,693,453.69	39.80364327	-80.81115636
13,000.00	89.00	150.00	10,967.49	-303.68	277.78	14,455,202.63	1,693,503.69	39.80340518	-80.81097901
13,100.00	89.00	150.00	10,969.23	-390.27	327.77	14,455,116.05	1,693,553.68	39.80316710	-80.81080166
13,200.00	89.00	150.00	10,970.98	-476.86	377.76	14,455,029.46	1,693,603.67	39.80292901	-80.81062431
13,300.00	89.00	150.00	10,972.72	-563.45	427.76	14,454,942.87	1,693,653.66	39.80269092	-80.81044696
13,400.00	89.00	150.00	10,974.47	-650.04	477.75	14,454,856.28	1,693,703.66	39.80245283	-80.81026962
13,500.00	89.00	150.00	10,976.21	-736.63	527.74	14,454,769.69	1,693,753.65	39.80221474	-80.81009227
13,600.00	89.00	150.00	10,977.96	-823.22	577.73	14,454,683.10	1,693,803.64	39.80197665	-80.80991493
13,700.00	89.00	150.00	10,979.70	-909.81	627.73	14,454,596.51	1,693,853.63	39.80173856	-80.80973759
13,800.00	89.00	150.00	10,981.45	-996.40	677.72	14,454,509.92	1,693,903.62	39.80150048	-80.80956025
13,900.00	89.00	150.00	10,983.19	-1,082.99	727.71	14,454,423.33	1,693,953.62	39.80126239	-80.80938291
14,000.00	89.00	150.00	10,984.94	-1,169.58	777.70	14,454,336.74	1,694,003.61	39.80102430	-80.80920557
14,100.00	89.00	150.00	10,986.68	-1,256.17	827.69	14,454,250.15	1,694,053.60	39.80078621	-80.80902823
14,200.00	89.00	150.00	10,988.43	-1,342.75	877.69	14,454,163.56	1,694,103.59	39.80054811	-80.80885089
14,300.00	89.00	150.00	10,990.17	-1,429.34	927.68	14,454,076.98	1,694,153.59	39.80031002	-80.80867356
14,400.00	89.00	150.00	10,991.92	-1,515.93	977.67	14,453,990.39	1,694,203.58	39.80007193	-80.80849623
14,500.00	89.00	150.00	10,993.67	-1,602.52	1,027.66	14,453,903.80	1,694,253.57	39.79983384	-80.80831869
14,600.00	89.00	150.00	10,995.41	-1,689.11	1,077.66	14,453,817.21	1,694,303.56	39.79959575	-80.80814156
14,700.00	89.00	150.00	10,997.16	-1,775.70	1,127.65	14,453,730.62	1,694,353.55	39.79935766	-80.80796423
14,800.00	89.00	150.00	10,998.90	-1,862.29	1,177.64	14,453,644.03	1,694,403.55	39.79911957	-80.80778691
14,900.00	89.00	150.00	11,000.65	-1,948.88	1,227.63	14,453,557.44	1,694,453.54	39.79888147	-80.80760958
15,000.00	89.00	150.00	11,002.39	-2,035.47	1,277.63	14,453,470.85	1,694,503.53	39.79864338	-80.80743225
15,100.00	89.00	150.00	11,004.14	-2,122.06	1,327.62	14,453,384.26	1,694,553.52	39.79840529	-80.80725493
15,200.00	89.00	150.00	11,005.88	-2,208.65	1,377.61	14,453,297.67	1,694,603.52	39.79816719	-80.80707760
15,300.00	89.00	150.00	11,007.63	-2,295.24	1,427.60	14,453,211.08	1,694,653.51	39.79792910	-80.80690028
15,400.00	89.00	150.00	11,009.37	-2,381.83	1,477.60	14,453,124.49	1,694,703.50	39.79769101	-80.80672296



Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 08HU (H)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1235.00ft
Project:	Marshall County, West Virginia.	MD Reference:	GL @ 1235.00ft
Site:	Woodford	North Reference:	Grid
Well:	Woodford 08HU (H)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,500.00	89.00	150.00	11,011.12	-2,468.42	1,527.59	14,453,037.91	1,694,753.49	39.79745291	-80.80654564
15,600.00	89.00	150.00	11,012.86	-2,555.01	1,577.58	14,452,951.32	1,694,803.49	39.79721482	-80.80636832
15,700.00	89.00	150.00	11,014.61	-2,641.59	1,627.57	14,452,864.73	1,694,853.48	39.79697672	-80.80619100
15,800.00	89.00	150.00	11,016.35	-2,728.18	1,677.57	14,452,778.14	1,694,903.47	39.79673863	-80.80601369
15,900.00	89.00	150.00	11,018.10	-2,814.77	1,727.56	14,452,691.55	1,694,953.46	39.79650053	-80.80583637
16,000.00	89.00	150.00	11,019.84	-2,901.36	1,777.55	14,452,604.96	1,695,003.45	39.79626244	-80.80565906
16,100.00	89.00	150.00	11,021.59	-2,987.95	1,827.54	14,452,518.37	1,695,053.45	39.79602434	-80.80548175
16,200.00	89.00	150.00	11,023.33	-3,074.54	1,877.53	14,452,431.78	1,695,103.44	39.79578624	-80.80530443
16,300.00	89.00	150.00	11,025.08	-3,161.13	1,927.53	14,452,345.19	1,695,153.43	39.79554815	-80.80512712
16,400.00	89.00	150.00	11,026.82	-3,247.72	1,977.52	14,452,258.60	1,695,203.42	39.79531005	-80.80494981
16,500.00	89.00	150.00	11,028.57	-3,334.31	2,027.51	14,452,172.01	1,695,253.42	39.79507195	-80.80477251
16,600.00	89.00	150.00	11,030.32	-3,420.90	2,077.50	14,452,085.42	1,695,303.41	39.79483386	-80.80459520
16,700.00	89.00	150.00	11,032.06	-3,507.49	2,127.50	14,451,998.84	1,695,353.40	39.79459576	-80.80441790
16,800.00	89.00	150.00	11,033.81	-3,594.08	2,177.49	14,451,912.25	1,695,403.39	39.79435766	-80.80424059
16,900.00	89.00	150.00	11,035.55	-3,680.67	2,227.48	14,451,825.66	1,695,453.39	39.79411956	-80.80406329
17,000.00	89.00	150.00	11,037.30	-3,767.26	2,277.47	14,451,739.07	1,695,503.38	39.79388147	-80.80388599
17,100.00	89.00	150.00	11,039.04	-3,853.85	2,327.47	14,451,652.48	1,695,553.37	39.79364337	-80.80370869
17,200.00	89.00	150.00	11,040.79	-3,940.43	2,377.46	14,451,565.89	1,695,603.36	39.79340527	-80.80353139
17,300.00	89.00	150.00	11,042.53	-4,027.02	2,427.45	14,451,479.30	1,695,653.35	39.79316717	-80.80335409
17,400.00	89.00	150.00	11,044.28	-4,113.61	2,477.44	14,451,392.71	1,695,703.35	39.79292907	-80.80317679
17,500.00	89.00	150.00	11,046.02	-4,200.20	2,527.44	14,451,306.12	1,695,753.34	39.79269097	-80.80299950
17,600.00	89.00	150.00	11,047.77	-4,286.79	2,577.43	14,451,219.53	1,695,803.33	39.79245287	-80.80282220
17,700.00	89.00	150.00	11,049.51	-4,373.38	2,627.42	14,451,132.94	1,695,853.32	39.79221477	-80.80264491
17,800.00	89.00	150.00	11,051.26	-4,459.97	2,677.41	14,451,046.35	1,695,903.32	39.79197667	-80.80246762
17,900.00	89.00	150.00	11,053.00	-4,546.56	2,727.41	14,450,959.76	1,695,953.31	39.79173857	-80.80229033
18,000.00	89.00	150.00	11,054.75	-4,633.15	2,777.40	14,450,873.18	1,696,003.30	39.79150047	-80.80211304
18,100.00	89.00	150.00	11,056.49	-4,719.74	2,827.39	14,450,786.59	1,696,053.29	39.79126237	-80.80193575
18,200.00	89.00	150.00	11,058.24	-4,806.33	2,877.38	14,450,700.00	1,696,103.28	39.79102426	-80.80175846
18,300.00	89.00	150.00	11,059.98	-4,892.92	2,927.37	14,450,613.41	1,696,153.28	39.79078616	-80.80158118
18,400.00	89.00	150.00	11,061.73	-4,979.51	2,977.37	14,450,526.82	1,696,203.27	39.79054806	-80.80140389
18,500.00	89.00	150.00	11,063.47	-5,066.10	3,027.36	14,450,440.23	1,696,253.26	39.79030996	-80.80122661
18,600.00	89.00	150.00	11,065.22	-5,152.69	3,077.35	14,450,353.64	1,696,303.25	39.79007185	-80.80104933
18,700.00	89.00	150.00	11,066.97	-5,239.28	3,127.34	14,450,267.05	1,696,353.25	39.78983375	-80.80087204
18,800.00	89.00	150.00	11,068.71	-5,325.86	3,177.34	14,450,180.46	1,696,403.24	39.78959565	-80.80069477
18,816.61	89.00	150.00	11,069.00	-5,340.25	3,185.64	14,450,166.08	1,696,411.54	39.78955610	-80.80066532

PBHL/TD 18816.61 MD/11069.00 TVD

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Woodford 08HU LP - hit/miss target - Shape - Point	0.00	0.00	10,930.00	1,552.25	-793.97	14,457,058.56	1,692,431.94	39.80850821	-80.81478134
- plan misses target center by 292.42ft at 11000.00ft MD (10720.95 TVD, 1373.97 N, -693.85 E)									
Woodford 08HU BHL - plan hits target center - Point	0.00	0.00	11,069.00	-5,340.25	3,185.64	14,450,166.08	1,696,411.54	39.78955610	-80.80066532

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Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 08HU (H)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1235.00ft
Project:	Marshall County, West Virginia.	MD Reference:	GL @ 1235.00ft
Site:	Woodford	North Reference:	Grid
Well:	Woodford 08HU (H)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,400.00	3,400.00	0.00	0.00	KOP Begin 2°/100' build
4,165.38	4,156.31	90.24	-46.77	Begin 15.31° tangent
10,262.97	10,037.57	1,519.42	-787.54	Begin 8°/100' drop/build/turn
11,566.61	10,942.47	937.48	-438.81	Begin 89.00° lateral
18,816.61	11,069.00	-5,340.25	3,185.64	PBHL/TD 18816.61 MD/11069.00 TVD

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 Environmental Protection

4705102149

WW-9
(4/16)

API Number 47 - 051 - _____
Operator's Well No. Woodford 8HU

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) French Creek - Ohio River Quadrangle Powhatan Point 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#1306426)

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.

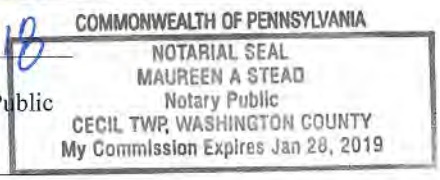
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations 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 James A. Pancake
Company Official (Typed Name) Jim Pancake
Company Official Title Vice President - Geoscience

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Environmental Protection

Subscribed and sworn before me this 16 day of NOVEMBER, 2018
Maureen A Stead Notary Public
My commission expires 1/28/19



Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 44.34 acres 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 Hubben*

Comments: _____

Title: Oil and Gas Inspector Date: 11/21/18

Field Reviewed? () Yes () No

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WW-9

PROPOSED WOODFORD 8HU
SHEET 1

SUPPLEMENT PG 1

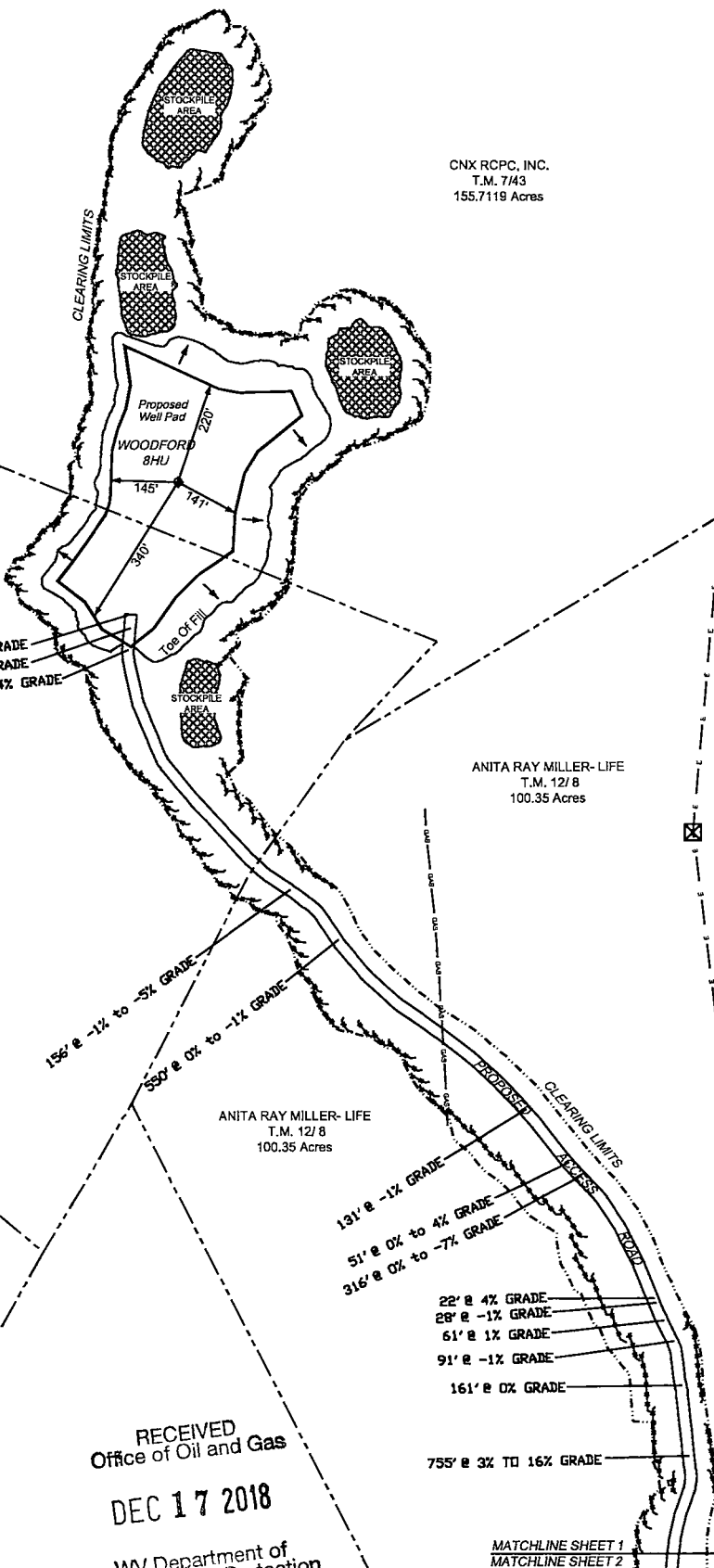
REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES 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.



CNX RCPC, INC.
T.M. 7/43
155.7119 Acres

CNX RCPC, LLC
T.M. 12/2
60.68 Acres

ANITA RAY MILLER-LIFE
T.M. 12/8
100.35 Acres

ANITA RAY MILLER-LIFE
T.M. 12/8
100.35 Acres

CNX RCPC, LLC
T.M. 12/3
62.30 Acres

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Environmental Protection

MATCHLINE SHEET 1
MATCHLINE SHEET 2

DRAWING NOT
TO SCALE

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

WW-9

**PROPOSED WOODFORD 8HU
SHEET 2**

MATCHLINE SHEET 1
MATCHLINE SHEET 2

SUPPLEMENT PG 1

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 8-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.

ROBERT WM RIGGENBACH ET UX
T.M. 12/ 7
104.231 Acres

LINDA HAMILTON ET AL
T.M. 12/ 13
41.887 Acres

RAYMOND K MILLER
T.M. 12/ 7.2
4.66 Acres

RAYMOND K MILLER
T.M. 12/ 7.1
1.609 Acres

RAYMOND K MILLER
T.M. 12/ 13.1
.113 Acres

ROBERT W. and
WENDY L. RIGGENBACH
T.M. 12/ 21.1
14.222 Acres

LINDA HAMILTON ET AL
T.M. 12/ 14
117.495 Acres

WOODLAND HILL
CHURCH OF GOD TRS
T.M. 12/ 15
.375 Acres

EDWARD L GIBSON - LIFE
T.M. 12/ 21
73.436 Acres

BORROW AREA

DOTY CEMETERY

CLEARING LIMITS

CLEARING LIMITS

61' @ 0% GRADE

457' @ -4% TO -14% GRADE

574' @ -1% TO -12% GRADE

35' @ 0% GRADE

71' @ 12% GRADE

306' @ -2% TO -11% GRADE

210' @ 0% GRADE

152' @ -5% TO -7% GRADE

53' @ 0% GRADE

59' @ 10% GRADE

425' @ 0% TO 5% GRADE

113' @ 0% GRADE

288' @ 3% TO 12% GRADE

194' @ 0% GRADE

223' @ -3% TO -11% GRADE

51' @ 0% GRADE

444' @ 5% TO 10% GRADE

45' @ 0% GRADE

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Environmental Protection

LEGEND

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

DRAWING NOT TO SCALE

DATE: 07-27-2018

PROJECT NO: 494510851

DRAWN BY: J.A.H.



Well Site Safety Plan

Tug Hill Operating, LLC

ju
11/21/18

Well Name: Woodford 8HU

Pad Location: Woodford

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

NORTHING -4,406,047.14

EASTING -516,096.29

November 2018

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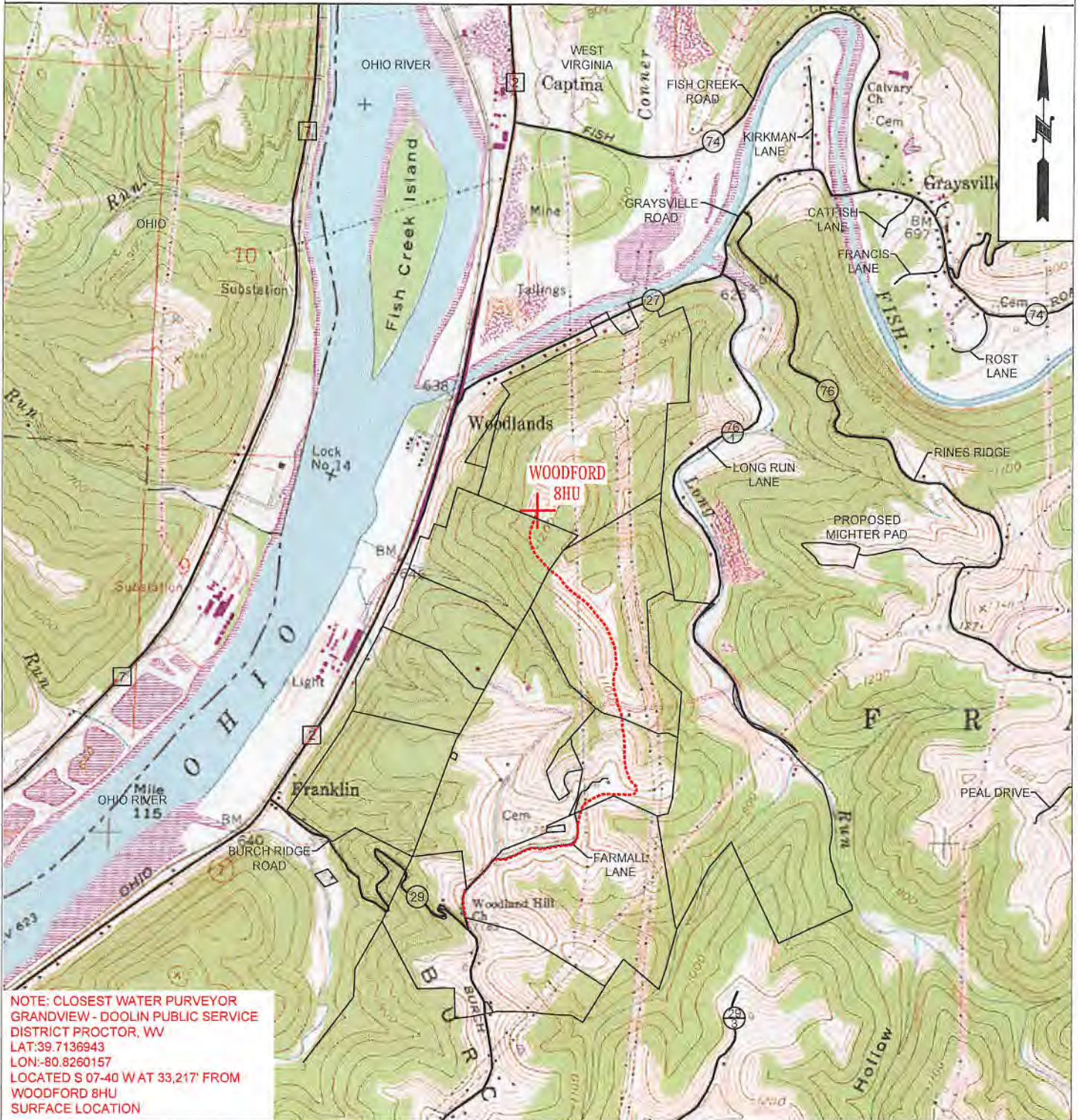
WW-9

PROPOSED WOODFORD 8HU


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SUPPLEMENT PG 2

DEC 17 2018

WV Department of
Environmental Protection



NOTE: CLOSEST WATER PURVEYOR
GRANDVIEW - DOOLIN PUBLIC SERVICE
DISTRICT PROCTOR, WV
LAT: 39.7136943
LON: -80.8260157
LOCATED S 07-40 W AT 33,217' FROM
WOODFORD 8HU
SURFACE LOCATION

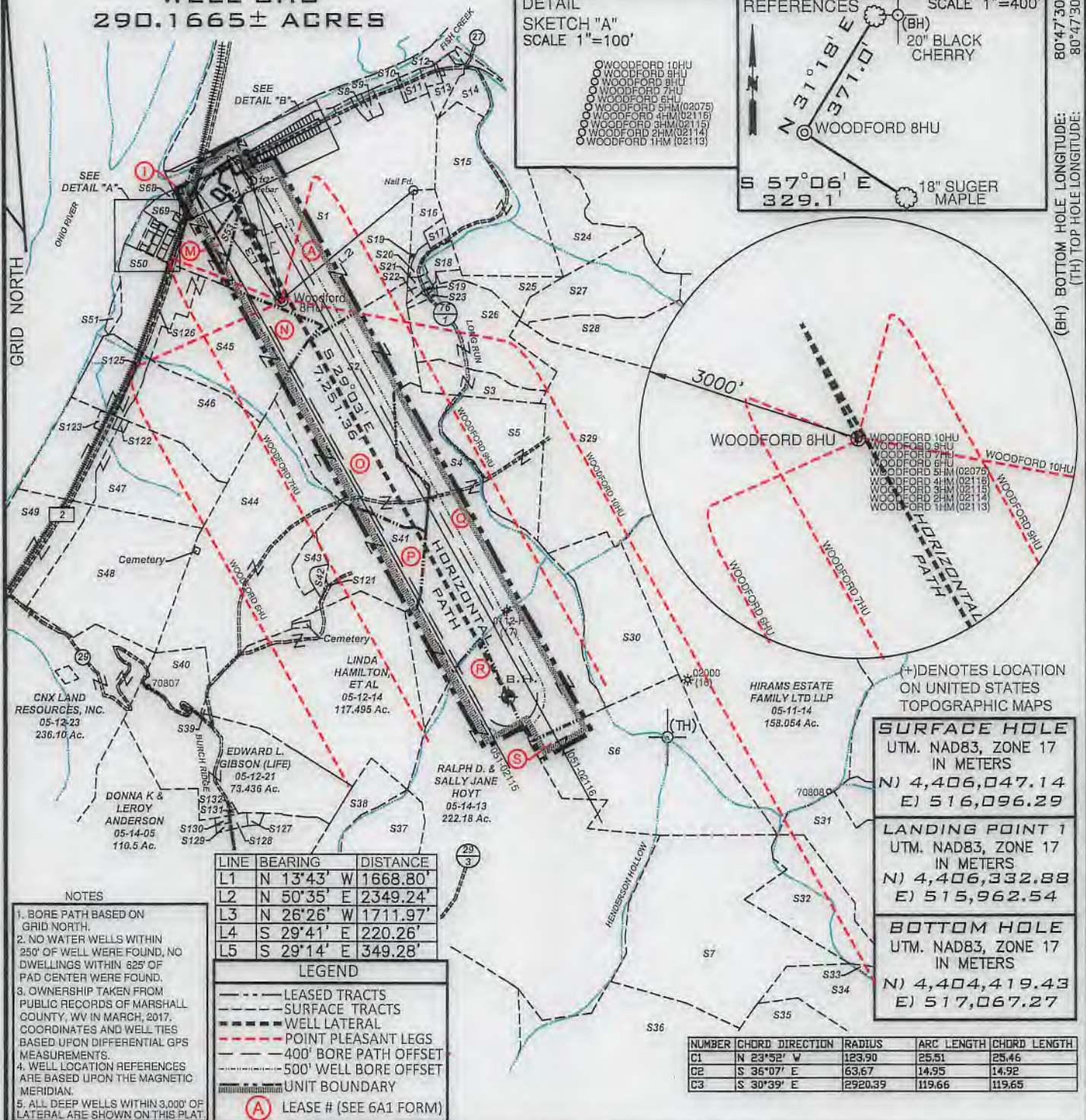
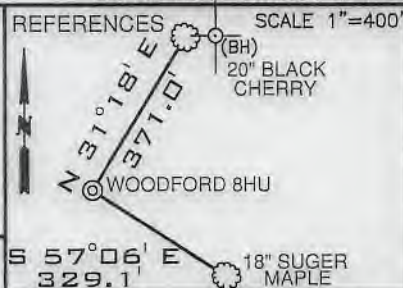
 TUG HILL OPERATING	OPERATOR	494510851	TOPO SECTION	LEASE NAME
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	WOODFORD
	SCALE:		1" = 2000'	DATE:

WOODFORD LEASE WELL 8HU 290.1665± ACRES

(TH) 5,754' (BH) 2,578'

TOP HOLE LATITUDE: 39°50'00"
BOTTOM HOLE LATITUDE: 39°47'30"

DETAIL
SKETCH "A"
SCALE 1"=100'



LINE	BEARING	DISTANCE
L1	N 13°43' W	1668.80'
L2	N 50°35' E	2349.24'
L3	N 26°26' W	1711.97'
L4	S 29°41' E	220.26'
L5	S 29°14' E	349.28'

LEGEND

- LEASE TRACTS
- - - SURFACE TRACTS
- - - WELL LATERAL
- - - POINT PLEASANT LEGS
- - - 400' BORE PATH OFFSET
- - - 500' WELL BORE OFFSET
- - - UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)

NUMBER	CHORD	DIRECTION	RADIUS	ARC LENGTH	CHORD LENGTH
C1	N 23°52' W		123.90	25.51	25.46
C2	S 36°07' E		63.67	14.95	14.92
C3	S 30°39' E		2920.39	119.66	119.65

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.
- ALL DEEP WELLS WITHIN 3,000' OF LATERAL ARE SHOWN ON THIS PLAT.

FILE NUMBER _____

DRAWING NUMBER WOODFORD_8HU_REV 1

SCALE 1" = 2000'

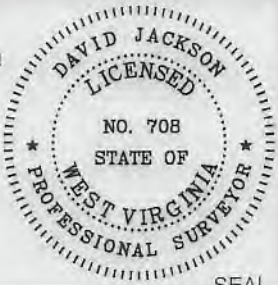
MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

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

David L Jackson

P.S. 708



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

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

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

DATE: DECEMBER 11, 2018
REVISED DATE: JANUARY 04, 2019

OPERATORS WELL NO. Woodford 8HU
API WELL NO. 47-051-02149 H6A
STATE COUNTY PERMIT

LOCATION ELEVATION 1233.51' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER
DISTRICT FRANKLIN COUNTY MARSHALL
QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER SEE WW-6A1 Form

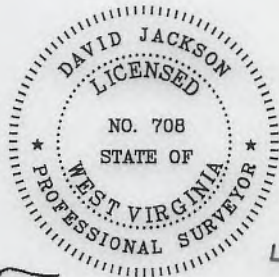
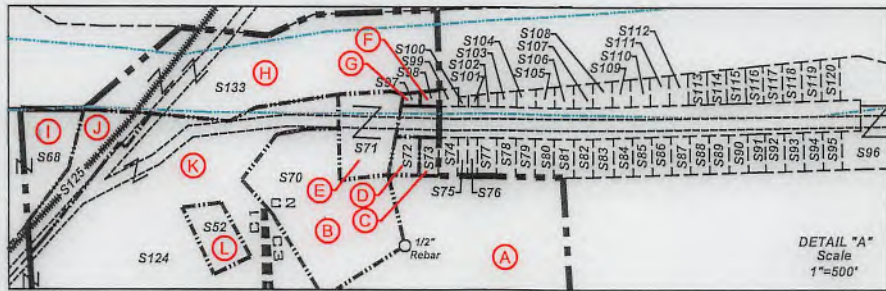
SURFACE OWNER CNX LAND, LLC ACREAGE 155.7119
OIL & GAS ROYALTY OWNER HG ENERGY II APPALACHIA LC (TRACT 5-7-43) LEASE ACREAGE 155.7119
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) _____ TVD: 11,152' TMD: 18,817'

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

COUNTY NAME
PERMIT

form wv6

**WOODFORD
LEASE
WELL 8HU
290.1665±
ACRES**



P.S.
708

David L Jackson

47-051-02149 H6A



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: WOODFORD 8HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

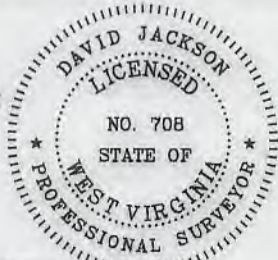
WELL PLAT
PAGE 2 OF 5
DATE: 12/11/2018
REVISED DATE:
01/04/2019

**WOODFORD
LEASE
WELL 8HU
290.1665±
ACRES**

Number	TAX MAP-PARCEL	SURFACE OWNER	ACRES
S1	(A) 05-07-43	CNX LAND, LLC	155.7119
S2	(O) 05-12-08	Anita Rae Miller (Life)	100.35
S3	05-12-10	Consolidation Coal Co./ Murray Energy	13.76
S4	(C) 05-12-12.1	Lionel L. Persinger, Et Ux.	148.09
S5	05-12-12	Lionel L. Persinger, Et Ux.	45
S6	(S) 05-11-15	Lionel L. Persinger, Et Ux.	93
S7	05-15-01	Marcus Sharp & David Schlabach, Hrs.	121
S8	05-7B-49	Cassidy Rain Carpenter	1.1441
S9	05-7B-48	Cassidy Rain Carpenter	1.325
S10	05-07-43.3	M. Frank Mason	0.327
S11	05-07-43.2	M. Frank Mason	1.36
S12	05-07-38	John K. Persinger, Et Ux.	2.65
S13	05-07-36	John Persinger	4.329
S14	05-07-35	Samuel L. Persinger	10.708
S15	05-07-39	Lionel L. Persinger, et ux	57
S16	05-07-42.1	Holly Rice	5.99
S17	05-07-41	James A. Wade	1
S18	05-07-42.5	Matthew V. Conner, et al	3.791
S19	05-07-42	Tracy M. Kesterson	0.54
S20	05-07-44	Crystal B. Darrah	1.726
S21	05-07-42.2	Steven & Rhonda Lloyd	0.85
S22	05-07-42.3	Joshua David Hartley	0.886
S23	05-07-42.4	Lionel & Mary Lee Persinger	0.94
S24	05-07-33	Lionel & Mary Lee Persinger	24.6
S25	05-12-09	Lionel & Mary Lee Persinger	10.15
S26	05-12-10.1	Consolidation Coal Co./ Murray Energy	38.48
S27	05-11-1.4	Larry W. Dunlap, et al	32.493
S28	05-11-1.1	Larry W. Dunlap & Charles Leroy Dunlap	34.405
S29	05-11-21	Karen Reed, et al	112.67
S30	05-12-11	Wesley B. Bryan & Wesley R. Bryan II	52.478
S31	05-15-04	Joseph J. Kramer, et ux	41.106
S32	05-15-03	Joseph J. Kramer, et ux	36.10
S33	05-15-02	John David Petrock, et ux	5
S34	05-15-14	John David Petrock, et ux	25
S35	05-15-12	John David Petrock, et ux	150.23
S36	05-15-15	Robert L. Shields, et al	49
S37	05-14-12	Dale R. Gallaher, et al	135.100
S38	05-14-10	Wanda P. Rine (Life)	107.372
S39	05-12-15	Woodland Hills Church of God Trs.	0.375
S40	05-12-21.1	Robert W. Jr. & Wendy L. Riggerbach	14.222
S41	(P) 05-12-13	Linda Hamilton, et al	41.887
S42	05-12-7.1	Raymond K. Miller	1.609
S43	05-12-7.2	Raymond K. Miller	4.66
S44	05-12-07	Robert Wm. Riggerbach, et ux	104.231
S45	(N) 05-12-02	CNX LAND, LLC	60.68
S46	05-12-03	CNX LAND, LLC	62.30
S47	05-12-05	CNX LAND, LLC	61.883
S48	05-12-06	CNX LAND, LLC	70.81
S49	05-12-6.2	Consolidation Coal Co./ Murray Energy	25.50
S50	05-12-2.1	Consolidation Coal Co./ Murray Energy	22
S51	05-12-01	US of America	1.68
S52	(L) 05-07-43.4	Ida Campbell	0.29
S53	(M) 05-07-43.1	State Road Commission	1.48
S54	05-7A-17	Carol Martin & Harry L. Yoho	0.3067
S55	05-7A-18	Barbara Anderson	0.1530
S56	05-7A-19	Barbara Anderson	0.3060

Number	TAX MAP-PARCEL	SURFACE OWNER	ACRES
S57	05-7A-20	Betty Sexton	0.1204
S58	05-7A-24	Rick A. Kosky	0.3152
S59	05-7A-23	Harold S. Young, et ux	0.3067
S60	05-7A-22	Richard Hyer, et ux	0.1530
S61	05-7A-21	David A. Beyser	0.1866
S62	05-7A-25	Rick A. Kosky	0.1638
S63	05-7A-26	Lance Clark	0.4531
S64	05-7A-27	Paul W. Barrett	0.1495
S65	05-7A-28	Richard Hyer, et ux	0.1093
S66	05-7A-29	Richard Hyer, et ux	0.1085
S67	05-7A-30	Richard Hyer, et ux	1.9
S68	(I) 05-7A-31	WVA Dept. of Natural Resources	3.18
S69	05-7A-32	Dawn Thompson Tennant	0.3091
S70	(B) 05-7A-02	CNX LAND, LLC	2.23
S71	(E) 05-7A-01	Lucille Myers	0.529
S72	(D) 05-7B-25	Cindy D. Aliff	0.1673
S73	(C) 05-7B-26	Cindy D. Aliff	0.1148
S74	05-7B-27	Patricia A. Johnson	0.1148
S75	05-7B-28	Patricia A. Johnson	0.0574
S76	05-7B-28.1	Patricia A. Johnson	0.0574
S77	05-7B-29	Patricia A. Johnson	0.1148
S78	05-7B-30	Cindy D. Aliff, et al	0.1148
S79	05-7B-31	Cindy D. Aliff, et al	0.1148
S80	05-7B-32	Albert J. Anderson, Jr.	0.1148
S81	05-7B-33	Albert J. Anderson, Jr.	0.1182
S82	05-7B-34	Albert J. Anderson, Jr.	0.1148
S83	05-7B-35	Albert J. Anderson, Jr.	0.1217
S84	05-7B-36	Albert J. Anderson, Jr.	0.1148
S85	05-7B-37	Teresa & Thomas Gouldsberry	0.1148
S86	05-7B-38	Teresa & Thomas Gouldsberry	0.1148
S87	05-7B-39	Teresa & Thomas Gouldsberry	0.1148
S88	05-7B-40	Teresa & Thomas Gouldsberry	0.1148
S89	05-7B-41	Teresa & Thomas Gouldsberry	0.1148
S90	05-7B-42	Teresa & Thomas Gouldsberry	0.1194
S91	05-7B-43	Teresa & Thomas Gouldsberry	0.1148
S92	05-7B-44	Daniel D. & Mary E. Robinson	0.1148
S93	05-7B-45	Daniel D. & Mary E. Robinson	0.1148
S94	05-7B-46	Daniel D. Robinson, et ux	0.1148
S95	05-7B-47	Daniel D. Robinson, et ux	0.1148
S96	05-7B-01	Patricia L. Robinson	1.257
S97	(G) 05-7B-24	Cindy D. Aliff	0.0354
S98	(F) 05-7B-23	Cindy D. Aliff	0.0471
S99	05-7B-22	Patricia A. Johnson	0.0505
S100	05-7B-21	Patricia A. Johnson	0.0287
S101	05-7B-21.1	Patricia A. Johnson	0.0296
S102	05-7B-20	Patricia A. Johnson	0.0626
S103	05-7B-19	Cindy D. Aliff, et al	0.0712
S104	05-7B-18	Cindy D. Aliff, et al	0.0763
S105	05-7B-17	Albert J. Anderson, Jr.	0.0849
S106	05-7B-16	Albert J. Anderson, Jr.	0.0903
S107	05-7B-15	Albert J. Anderson, Jr.	0.0970
S108	05-7B-14	Albert J. Anderson, Jr.	0.0991
S109	05-7B-13	Albert J. Anderson, Jr.	0.1067
S110	05-7B-12	Teresa & Thomas Gouldsberry	0.1113
S111	05-7B-11	Teresa & Thomas Gouldsberry	0.1159
S112	05-7B-10	Teresa & Thomas Gouldsberry	0.1199
S113	05-7B-09	Teresa & Thomas Gouldsberry	0.1240
S114	05-7B-08	Teresa & Thomas Gouldsberry	0.1286
S115	05-7B-07	Teresa & Thomas Gouldsberry	0.1331
S116	05-7B-06	Teresa & Thomas Gouldsberry	0.1377
S117	05-7B-05	Daniel D. & Mary E. Robinson	0.1418
S118	05-7B-04	Daniel D. & Mary E. Robinson	0.1458
S119	05-7B-03	Daniel D. Robinson, et ux	0.1504
S120	05-7B-02	Daniel D. Robinson, et ux	0.1550
S121	05-12-13.1	Raymond K. Miller	0.113
S122	05-12-5.1	CNX LAND, LLC	0.52
S123	05-12-04	CNX LAND, LLC	0.93
S124	(K) Rt. 2	State Road Commission	17.62(Calc.)
S125	(J) R.R.	CSX Transportation	4.99(Calc.)
S126	Rt. 2	WV DOT	4.18(Calc.)
S127	05-12-17	Hilda Deloris Baxter	0.752
S128	05-12-18	Hilda Deloris Baxter	1.018
S129	05-12-19	Delores J. Myers (Life)	0.457
S130	05-12-20	Delores J. Myers (Life)	0.457
S131	05-12-16.1	Gary E. Gibson, et al	0.146
S132	05-12-16	Gary E. Gibson, et al	0.104
S133	(H) Fish Creek	State of W.V.	3.90(Calc.)

47-051-02149 H6A



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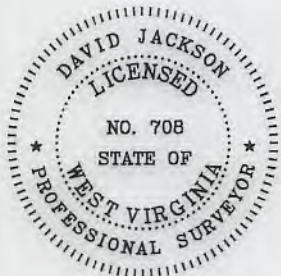
OPERATOR'S
WELL #: WOODFORD 8HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: wv

WELL PLAT
PAGE 3 OF 5
DATE: 12/11/2018
REVISED DATE:
01/04/2019

**WOODFORD
LEASE
WELL 8HU
290.1665±
ACRES**

LEASE NO.	TAGS	PARCEL	OIL & GAS ROYALTY OWNER	DEED BOOK	PAGE
041112	A	5-7-43	COLUMBIAN CHEMICALS COMPANY	691	363
041112	B	5-7A-2	COLUMBIAN CHEMICALS COMPANY	691	363
Q088417002	B	5-7A-2	WANDA MAE BLAKE	853	316
Q088417003	B	5-7A-2	JOAN JANE PARSONS AND GARY PARSONS	859	506
Q088417004	B	5-7A-2	IDA L CAMPBELL	859	496
Q078651000	C	5-7B-26	JUNE M MORRIS AKA JUNE MORRIS	808	388
Q089614000	D	5-7B-25	JUNE M MORRIS	852	347
Q074927000	E	5-7A-1	LUCILLE MYERS	794	497
Q089614000	F	5-7B-23	JUNE M MORRIS	852	347
Q089614000	G	5-7B-24	JUNE M MORRIS	852	347
Q091960000	H	FISH CREEK - WV	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	865	558
Q091960000	I	5-7A-31	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	865	558
Q095360000	J	CSX TRANSPORTATION	CSX TRANSPORTATION INC	879	251
Q088417001	J	CSX TRANSPORTATION	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	845	332
Q088417001	K	RTE 2 - STATE ROAD COMMISSION	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	845	332
041112	K	RTE 2 - STATE ROAD COMMISSION	COLUMBIAN CHEMICALS COMPANY	691	363
Q088417001	L	5-7-43.4	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	845	332
Q075763000	M	5-7-43.1	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	797	642
041112	N	5-12-2	COLUMBIAN CHEMICALS COMPANY	691	363
10*23969	O	5-12-8	MARK A. JOHNSON ET UX	1020	195
10*24588	O	5-12-8	MICHAEL POWDERLY	1025	287
10*24577	O	5-12-8	LYNN A. YATES & WALTER R. YATES		
10*23896	O	5-12-8	MOLLY MCMAHON AND JOHN D. MCMAHON	1017	489
10*18827	O	5-12-8	ERIN E SCHOLL	937	626
10*18835	O	5-12-8	REBECCA LYNN KIER AND ERIC JAMES KIER	937	405
10*18968	O	5-12-8	ESHIELA PAVLOVICH	940	291
10*18969	O	5-12-8	JEANNE MARIE VAN GROU AND RICHARD ARTHUR	941	289
10*19500	O	5-12-8	JAMES CONTRERAS AND CATHERINE CONTRERAS	942	608
10*19825	O	5-12-8	THOMAS A POWDERLY	945	639
10*19826	O	5-12-8	TERRANCE V POWDERLY SR	945	637
10*19827	O	5-12-8	CORINNE E VERNA AND JONATHAN C VERNA SR	945	635
10*19828	O	5-12-8	ANNE M AND JOHN LEACH	945	633
10*19829	O	5-12-8	MARGARET J WHITFORD AND LANCE W WHITFORD	945	631
10*19830	O	5-12-8	DAVID POWDERLY AND NANCY A POWDERLY	945	629
10*21002	O	5-12-8	STANLEY EUGENE STOWE	951	215
10*21045	O	5-12-8	SANDRA J HARMON AND WALTER D HARMON	951	217
10*21190	O	5-12-8	MARGARET CLICKNER	941	283
10*21223	O	5-12-8	EUGENE C GRIEB AND SHIRLEY K GRIEB	961	468
10*21607	O	5-12-8	SHERLEY R STOWE & KAREN M STOWE	959	474
10*21924	O	5-12-8	BEVERLY A MILLER	953	533
10*21926	O	5-12-8	VIOLA JANE BREON AND JAMES RONALD BREON	953	360
10*21929	O	5-12-8	BENNY MILLER	960	177
10*21930	O	5-12-8	JAMES A GRENOBLE AND MARY JANE GRENOBLE	953	263
10*21938	O	5-12-8	SEAN M GRENOBLE AND CHERYL A GRENOBLE	960	91
10*21939	O	5-12-8	ULA F NELSON	960	96
10*22051	O	5-12-8	NOEL A PARKS	960	509
10*22309	O	5-12-8	AARON D LITMAN AND BETTY J LITMAN	963	408
10*22311	O	5-12-8	WILLIAM L LITMAN AND VICKIE L LITMAN	963	404
10*22312	O	5-12-8	RICHARD WOOD AND VICKI WOOD	962	528
10*22349	O	5-12-8	ANITA RAE MILLER	910	152
10*22408	O	5-12-8	REBECCA S TARR	962	578
10*22548	O	5-12-8	SHARON TOLER WILLIAMS & HERVY WILLIAMS	966	194
10*22604	O	5-12-8	WILLIAM LEESON	966	499
10*22605	O	5-12-8	MICHAEL R LEESON AND BRENDA R LEESON	966	496
10*22744	O	5-12-8	BRIDGET A POWDERLY	968	206
10*22858	O	5-12-8	THOMAS C DAVIS AND MARY ELLEN DAVIS	977	63
10*23004	O	5-12-8	KLOVA A MORRIS	977	382
Q083768001	O	5-12-8	SANDRA WINSLOW	831	54
Q083768002	O	5-12-8	KERMIT REED HUBBS ET UX	831	163
Q083768003	O	5-12-8	DOUGLAS G DERROW	831	165
Q083768004	O	5-12-8	FERN A PICKENPAUGH	831	167
Q083768005	O	5-12-8	JEAN GAUTHIER	832	228
Q083768006	O	5-12-8	SONDRA SUE RULONG ET VIR	832	230
Q083768007	O	5-12-8	VERA SHIRLENE WORKMAN ET VIR	832	232
Q083768008	O	5-12-8	CHARLOTTE A MERSEUS ET VIR	833	14
Q083768009	O	5-12-8	PHYLLIS JEAN OSTRANDER	833	472
Q083768010	O	5-12-8	JAMES A KOLL	832	584
Q083768011	O	5-12-8	MICHAEL W DERROW	833	464
Q083768012	O	5-12-8	WILLIAM L WILLIAMS ET UX	833	574
Q083768013	O	5-12-8	KELLY KERN	863	189
Q083768014	O	5-12-8	SHIRLEY G BUR	863	191
Q083768015	O	5-12-8	NORMAN L DERROW ET UX	832	580
Q083768016	O	5-12-8	BETTY JUNE CAMPBELL ET VIR	834	632
Q083768017	O	5-12-8	LAMOYNE S BAKER	834	634
Q083768018	O	5-12-8	HONUS ADAIR STOLLAR	836	36
Q083768019	O	5-12-8	MARTHA J JAMISON ET VIR	836	38
Q083768020	O	5-12-8	SARA BRADLEY	839	206
Q083768021	O	5-12-8	MARY S FOGLESONG ET VIR	837	352
Q083768024	O	5-12-8	JIMMIE WILLIAMS ET UX	837	143
Q083768025	O	5-12-8	JUDY ANN MCCHESKEY ET VIR	840	291
Q083768026	O	5-12-8	PENNY S SCHAUER ET VIR	842	7
Q083768027	O	5-12-8	TRACI L WILLIAMS	842	9
Q083768028	O	5-12-8	STEVEN S DERROW	842	24
Q083768029	O	5-12-8	MARY E VOLTZ ET VIR	841	82
Q083768030	O	5-12-8	ELLIOTT L THRASHER II ET UX	842	510
Q083768031	O	5-12-8	JACK M FOREMAN	844	131
Q083768032	O	5-12-8	DOUGLAS E MILLER	844	520
Q083768033	O	5-12-8	REVA J JICARD ET VIR	844	526
Q083768034	O	5-12-8	JULIE SPRINGWATER	850	491
Q083768035	O	5-12-8	JULIE SPRINGWATER	850	499
Q083768036	O	5-12-8	JACK M FOREMAN	850	503
Q083768037	O	5-12-8	ANITA M MASON	851	5
Q083768038	O	5-12-8	BONNIE H GRISELL ET VIR	850	646
Q083768039	O	5-12-8	MARY ELIZABETH VOLTZ ET VIR	850	648

47-051-02149 H6A



P.S. 708

David L Jackson



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: Woodford 8HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE: 4 OF 5
DATE: 12/11/2018
REVISED DATE:
01/04/2019

**WOODFORD
LEASE
WELL 8HU
290.1665±
ACRES**

LEASE NO.	TAGS	PARCEL	OIL & GAS ROYALTY OWNER	DEED BOOK	PAGE
Q083768040	O	5-12-8	SCOTT C HARRIS ET UX	851	394
Q083768041	O	5-12-8	JACK M FOREMAN	854	178
Q083768042	O	5-12-8	JACQUELYN JOHNSON ET VIR	860	523
Q083768043	O	5-12-8	ROY JOSEPH LEACH	859	487
Q083768044	O	5-12-8	LESLIE ANN BLYTHE ET VIR	860	535
Q083768045	O	5-12-8	MURIEL ANNE MILLER ET VIR	860	545
Q083768046	O	5-12-8	GREGORY S MILLER ET UX	860	517
Q083768047	O	5-12-8	REBECCA L CULLEN ET VIR	860	558
Q083768048	O	5-12-8	FRANCES E RUTLEDGE ET VIR	860	513
Q083768049	O	5-12-8	LARRY DEAN MCWHORTER ET AL	860	529
Q083768050	O	5-12-8	LEROY MILLER	860	532
Q083768051	O	5-12-8	DAVID LEE EVANS JR ET UX	864	187
Q083768052	O	5-12-8	STEVEN POND ET UX	860	574
Q083768053	O	5-12-8	IAN KIPP HAGEMANN	860	520
Q083768054	O	5-12-8	MELISSA MILLER GIBSON ET VIR	869	100
Q083768055	O	5-12-8	HEATHER D MALO ET VIR	866	336
Q083768056	O	5-12-8	RODNEY F PETERSON	866	342
Q083768057	O	5-12-8	PRISCILLA ANN MILLER HADEN	873	545
Q083768058	O	5-12-8	DANIEL D HOBBS ET UX	873	543
Q083768059	O	5-12-8	RICHARD S MULLEN ET UX	869	98
Q083768060	O	5-12-8	JAMES B CROW ET UX	869	108
Q083768061	O	5-12-8	GREGORY S CROW	869	106
Q083768062	O	5-12-8	HAROLD B CROW ET UX	869	102
Q083768063	O	5-12-8	BRIAN K CROW	869	104
Q083768064	O	5-12-8	TIMOTHY HOWARD MANCHEGO	873	104
Q083768065	O	5-12-8	KATHLEEN HOBBS YOUNG	869	356
Q083768066	O	5-12-8	DAVID C MULLEN ET UX	869	358
Q083768067	O	5-12-8	DENNIS FISCHER ET UX	870	360
Q083768068	O	5-12-8	KATHLEEN A SULLIVAN ET VIR	870	362
Q083768069	O	5-12-8	FRANCIS F FISCHER ET UX	871	494
Q083768070	O	5-12-8	JOYCE A FIORILLI ET VIR	873	114
Q083768071	O	5-12-8	BARBARA L VOGLER ET VIR	873	112
Q083768072	O	5-12-8	HARRIET C HERMAN ET VIR	873	116
Q083768073	O	5-12-8	EUGENIA A KERR	873	118
Q083768074	O	5-12-8	JANE H BARNSTEINER ET UX	873	93
Q083768075	O	5-12-8	EDWARD P POWDERLY ET UX	873	91
Q083768076	O	5-12-8	NORA C POWDERLY	873	89
Q083768077	O	5-12-8	EILEEN T POWDERLY	873	87
Q083768078	O	5-12-8	MARY F WEILAND	873	124
Q083768079	O	5-12-8	JAMES E HERMAN	873	128
Q083768080	O	5-12-8	ANTHONY T POWDERLY ET UX	878	363
Q083768081	O	5-12-8	SHARON L SCHOLL	878	379
Q083768082	O	5-12-8	JAMES T SCHOLL	878	376
Q083768083	O	5-12-8	ANNE GALBALLY ET VIR	878	354
Q083768084	O	5-12-8	CLARK D CHASE ET UX	878	357
Q083768085	O	5-12-8	BRIDGET A POWDERLY	881	29
Q083768086	O	5-12-8	NORA K POWDERLY	881	23
Q083768087	O	5-12-8	KEVIN M POWDERLY	890	518
Q083768088	O	5-12-8	MARY S SCHOLL	890	569
Q083768089	O	5-12-8	BRIAN P POWDERLY ET UX	890	563
Q083768090	O	5-12-8	SUSANNE S QUARTERMAN	890	560
Q083768091	O	5-12-8	HARRIET C VENTURA ET VIR	894	541
Q083768099	O	5-12-8	EILEEN T POWDERLY	873	81
10*21769	P	5-12-13	BETTY HAMILTON	957	419
10*21770	P	5-12-13	SUSAN WINLAND AND PAUL MICHAEL WINLAND	957	421
10*21776	P	5-12-13	LINDA HAMILTON	957	417
10*16918	Q	5-12-12.1	LIONEL L AND MARY LEE PERSINGER	976	617
10*14067	R	5-14-13	REVA FRANZE	666	51
10*14911	S	5-11-15	FORREST MILLER	819	316
10*16913	S	5-11-15	LIONEL L AND MARY LEE PERSINGER	976	626
10*17329	S	5-11-15	JOHN P ICARD AND REVA J ICARD	943	524
10*18045	S	5-11-15	KLOVA ANN MORRIS	927	114
10*18174	S	5-11-15	THE ESTATE OF ROY JOSEPH LEACH	927	647
10*19642	S	5-11-15	NOEL A PARKS	944	92
10*21455	S	5-11-15	MELISSA MILLER GIBSON AND JAMES GIBSON	953	308
10*21903	S	5-11-15	WILLIAM R VOLTZ AND SHARON VOLTZ	960	182
10*21904	S	5-11-15	MARY S MAGERS AND WILLIAMS MAGERS	960	158
10*21905	S	5-11-15	DAVID F VOLTZ AND LINDA VOLTZ	961	444
10*21906	S	5-11-15	MICHAEL P VOLTZ	960	164
10*21910	S	5-11-15	J THOMAS VOLTZ AND NANCY VOLTZ	960	179
10*21939	S	5-11-15	ULA F NELSON	960	96
10*22134	S	5-11-15	JACK MICHAEL FOREMAN	961	449
10*22309	S	5-11-15	AARON D LITMAN AND BETTY J LITMAN	963	408
10*22311	S	5-11-15	WILLIAM L LITMAN AND VICKIE L LITMAN	963	404
10*22312	S	5-11-15	RICHARD WOOD AND VICKI WOOD	962	528
10*22438	S	5-11-15	JULIE SPRINGWATER	964	231
10*22559	S	5-11-15	SHARON TOLER WILLIAMS & HERVY WILLIAMS	966	94



P.S.
708

David L Jackson

47-051-02149 H6A



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: Woodford 8HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE: 5 OF 5
DATE: 12/11/2018
REVISED DATE:
01/04/2019

WW-6A1
(5/13)

Operator's Well No. Woodford 8HU

**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
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*See attached pages

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DEC 17 2018

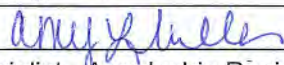
WV Department of
Environmental Protection

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

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

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

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

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

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
041112	5-7-43	A	COLUMBIAN CHEMICALS COMPANY	CNX LAND RESOURCES INC	1/8+	691	363	N/A	N/A	CNX Land Resources Inc to CNX Gas Company LLC: 745/117	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
041112	5-7A-2	B	COLUMBIAN CHEMICALS COMPANY	CNX LAND RESOURCES INC	1/8+	691	363	N/A	N/A	CNX Land Resources Inc to CNX Gas Company LLC: 745/117	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q088417002	5-7A-2	B	WANDA MAE BLAKE	NOBLE ENERGY INC	1/8+	853	316	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q088417003	5-7A-2	B	JOAN JANE PARSONS AND GARY PARSONS	NOBLE ENERGY INC	1/8+	859	506	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q088417004	5-7A-2	B	IDA L CAMPBELL	NOBLE ENERGY INC	1/8+	859	496	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q078651000	5-7B-26	C	JUNE M MORRIS AKA JUNE MORRIS	NOBLE ENERGY INC	1/8+	808	388	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q089614000	5-7B-25	D	JUNE M MORRIS	NOBLE ENERGY INC	1/8+	852	347	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q074927000	5-7A-1	E	LUCILLE MYERS	NOBLE ENERGY INC	1/8+	794	497	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q089614000	5-7B-23	F	JUNE M MORRIS	NOBLE ENERGY INC	1/8+	852	347	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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 Environmental Protection

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
Q089614000	5-7B-24	G	JUNE M MORRIS	NOBLE ENERGY INC	1/8+	852 347	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q091960000	FISH CREEK - WV	H	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	NOBLE ENERGY INC	1/8+	865 558	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q091960000	5-7A-31	I	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	NOBLE ENERGY INC	1/8+	865 558	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q095360000	CSX TRANSPORTATION	J	CSX TRANSPORTATION INC	NOBLE ENERGY INC	1/8+	879 251	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q088417001	CSX TRANSPORTATION	J	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	NOBLE ENERGY INC	1/8+	845 332	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/407 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q088417001	RTE 2 - STATE ROAD COMMISSION	K	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	NOBLE ENERGY INC	1/8+	845 332	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/407 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
041112	RTE 2 - STATE ROAD COMMISSION	K	COLUMBIAN CHEMICALS COMPANY	CNX LAND RESOURCES INC	1/8+	691 363	N/A	N/A	CNX Land Resources Inc to CNX Gas Company LLC: 745/117	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q088417001	5-7-43.4	L	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	NOBLE ENERGY INC	1/8+	845 332	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/407 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q075763000	5-7-43.1	M	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION	NOBLE ENERGY INC	1/8+	797 642	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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WV Department of
Environmental Protection

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
041112	5-12-2	N	COLUMBIAN CHEMICALS COMPANY	CNX LAND RESOURCES INC	1/8+	691	363	N/A	N/A	CNX Land Resources Inc to CNX Gas Company LLC: 745/117	CNX Gas Company LLC to Noble Energy Inc: 752/66	CNX Gas Company LLC to Noble Energy Inc: 909/94	Noble Energy Inc to HG Energy II Appalachia LLC: 931/43	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
10*23969	5-12-8	O	MARK A. JOHNSON ET UX	TH EXPLORATION LLC	1/8+	1020	195	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24588	5-12-8	O	MICHAEL POWDERLY	TH EXPLORATION LLC	1/8+	1025	287	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24577	5-12-8	O	LYNN A. YATES & WALTER R. YATES	TH EXPLORATION LLC	1/8+	PENDING		N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23896	5-12-8	O	MOLLY MCMAHON AND JOHN D. MCMAHON	TH EXPLORATION LLC	1/8+	1017	489	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18827	5-12-8	O	ERIN E SCHOLL	TH EXPLORATION LLC	1/8+	937	626	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18835	5-12-8	O	REBECCA LYNN KIER AND ERIC JAMES KIER	TH EXPLORATION LLC	1/8+	937	405	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18968	5-12-8	O	E SHIELA PAVLOVICH	TH EXPLORATION LLC	1/8+	940	291	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18969	5-12-8	O	JEANNE MARIE VAN GROL AND RICHARD ARTHUR VAN	TH EXPLORATION LLC	1/8+	941	289	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19500	5-12-8	O	JAMES CONTRERAS AND CATHERINE CONTRERAS	TH EXPLORATION LLC	1/8+	942	608	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19825	5-12-8	O	THOMAS A POWDERLY	TH EXPLORATION LLC	1/8+	945	639	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19826	5-12-8	O	TERRANCE V POWDERLY SR	TH EXPLORATION LLC	1/8+	945	637	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19827	5-12-8	O	CORINNE E VERNA AND JONATHAN C VERNA SR	TH EXPLORATION LLC	1/8+	945	635	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19828	5-12-8	O	ANNE M AND JOHN LEACH	TH EXPLORATION LLC	1/8+	945	633	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19829	5-12-8	O	MARGARET J WHITFORD AND LANCE W WHITFORD	TH EXPLORATION LLC	1/8+	945	631	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19830	5-12-8	O	DAVID POWDERLY AND NANCY A POWDERLY	TH EXPLORATION LLC	1/8+	945	629	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21002	5-12-8	O	STANLEY EUGENE STOWE	TH EXPLORATION LLC	1/8+	951	215	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21045	5-12-8	O	SANDRA J HARMON AND WALTER D HARMON	TH EXPLORATION LLC	1/8+	951	217	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21190	5-12-8	O	MARGARET CLICKNER	TH EXPLORATION LLC	1/8+	941	283	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21223	5-12-8	O	EUGENE C GRIEB AND SHIRLEY K GRIEB	TH EXPLORATION LLC	1/8+	961	468	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21607	5-12-8	O	SHERLEY R STOWE & KAREN M STOWE	TH EXPLORATION LLC	1/8+	959	474	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21924	5-12-8	O	BEVERLY A MILLER	TH EXPLORATION LLC	1/8+	953	533	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21926	5-12-8	O	VIOLA JANE BREON AND JAMES RONALD BREON	TH EXPLORATION LLC	1/8+	953	360	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21929	5-12-8	O	BENNY MILLER	TH EXPLORATION LLC	1/8+	960	177	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21930	5-12-8	O	JAMES A GRENOBLE AND MARY JANE GRENOBLE	TH EXPLORATION LLC	1/8+	953	263	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21938	5-12-8	O	SEAN M GRENOBLE AND CHERYL A GRENOBLE	TH EXPLORATION LLC	1/8+	960	91	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21939	5-12-8	O	ULA F NELSON	TH EXPLORATION LLC	1/8+	960	96	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22051	5-12-8	O	NOEL A PARKS	TH EXPLORATION LLC	1/8+	960	509	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22309	5-12-8	O	AARON D LITMAN AND BETTY J LITMAN	TH EXPLORATION LLC	1/8+	963	408	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22311	5-12-8	O	WILLIAM L LITMAN AND VICKIE L LITMAN	TH EXPLORATION LLC	1/8+	963	404	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22312	5-12-8	O	RICHARD WOOD AND VICKI WOOD	TH EXPLORATION LLC	1/8+	962	528	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22349	5-12-8	O	ANITA RAE MILLER	AMERICAN PETROLEUM PARTNERS LLC	1/8+	910	152	N/A	N/A	N/A	N/A	N/A	N/A	American Petroleum Partners Operating LLC to TH Exploration LLC: 42/109
10*22408	5-12-8	O	REBECCA S TARR	TH EXPLORATION LLC	1/8+	962	578	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22548	5-12-8	O	SHARON TOLER WILLIAMS & HERVY WILLIAMS	TH EXPLORATION LLC	1/8+	966	194	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22604	5-12-8	O	WILLIAM LEESON	TH EXPLORATION LLC	1/8+	966	499	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22605	5-12-8	O	MICHAEL R LEESON AND BRENDA R LEESON	TH EXPLORATION LLC	1/8+	966	496	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22744	5-12-8	O	BRIDGET A POWDERLY	TH EXPLORATION LLC	1/8+	968	206	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22858	5-12-8	O	THOMAS C DAVIS AND MARY ELLEN DAVIS	TH EXPLORATION LLC	1/8+	977	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23004	5-12-8	O	KLOVA A MORRIS	TH EXPLORATION LLC	1/8+	977	382	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Operator's Well No. Woodford - 8HU

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
Q083768001	5-12-8	O	SANDRA WINSLOW	NOBLE ENERGY INC	1/8+	831 54	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768002	5-12-8	O	KERMIT REED HUBBS ET UX	NOBLE ENERGY INC	1/8+	831 163	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768003	5-12-8	O	DOUGLAS G DERROW	NOBLE ENERGY INC	1/8+	831 165	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768004	5-12-8	O	FERN A PICKENPAUGH	NOBLE ENERGY INC	1/8+	831 167	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768005	5-12-8	O	JEAN GAUTHIER	NOBLE ENERGY INC	1/8+	832 228	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768006	5-12-8	O	SONDRA SUE RULONG ET VIR	NOBLE ENERGY INC	1/8+	832 230	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768007	5-12-8	O	VERA SHIRLENE WORKMAN ET VIR	NOBLE ENERGY INC	1/8+	832 232	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768008	5-12-8	O	CHARLOTTE A MERSELIS ET VIR	NOBLE ENERGY INC	1/8+	833 14	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768009	5-12-8	O	PHYILLIS JEAN OSTRANDER	NOBLE ENERGY INC	1/8+	833 472	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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Q083768010	5-12-8	O	JAMES A KOLL	NOBLE ENERGY INC	1/8+	832	584	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768011	5-12-8	O	MICHAEL W DERROW	NOBLE ENERGY INC	1/8+	833	464	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768012	5-12-8	O	WILLIAM L WILLIAMS ET UX	NOBLE ENERGY INC	1/8+	833	574	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768013	5-12-8	O	KELLY KERN	NOBLE ENERGY INC	1/8+	863	189	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768014	5-12-8	O	SHIRLEY GBUR	NOBLE ENERGY INC	1/8+	863	191	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768015	5-12-8	O	NORMAN L DERROW ET UX	NOBLE ENERGY INC	1/8+	832	580	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768016	5-12-8	O	BETTY JUNE CAMPBELL ET VIR	NOBLE ENERGY INC	1/8+	834	632	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768017	5-12-8	O	LAMOYNE S BAKER	NOBLE ENERGY INC	1/8+	834	634	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768018	5-12-8	O	HONUS ADAIR STOLLAR	NOBLE ENERGY INC	1/8+	836	36	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1

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Q083768019	5-12-8	O	MARTHA J JAMISON ET VIR	NOBLE ENERGY INC	1/8+	836 38	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
Q083768020	5-12-8	O	SARA BRADLEY	NOBLE ENERGY INC	1/8+	839 206	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
Q083768021	5-12-8	O	MARY S FOGLESONG ET VIR	NOBLE ENERGY INC	1/8+	837 352	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
Q083768024	5-12-8	O	JIMMIE WILLIAMS ET UX	NOBLE ENERGY INC	1/8+	837 143	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
Q083768025	5-12-8	O	JUDY ANN MCCHESEY ET VIR	NOBLE ENERGY INC	1/8+	840 291	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
Q083768026	5-12-8	O	PENNY S SCHAUER ET VIR	NOBLE ENERGY INC	1/8+	842 7	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
Q083768027	5-12-8	O	TRACI L WILLIAMS	NOBLE ENERGY INC	1/8+	842 9	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
Q083768028	5-12-8	O	STEVEN S DERROW	NOBLE ENERGY INC	1/8+	842 24	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
Q083768029	5-12-8	O	MARY E VOLTZ ET VIR	NOBLE ENERGY INC	1/8+	841 82	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

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Q083768030	5-12-8	O	ELLIOTT L THRASHER II ET UX	NOBLE ENERGY INC	1/8+	842	510	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768031	5-12-8	O	JACK M FOREMAN	NOBLE ENERGY INC	1/8+	844	131	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768032	5-12-8	O	DOUGLAS E MILLER	NOBLE ENERGY INC	1/8+	844	520	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768033	5-12-8	O	REVA J ICARD ET VIR	NOBLE ENERGY INC	1/8+	844	526	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768034	5-12-8	O	JULIE SPRINGWATER	NOBLE ENERGY INC	1/8+	850	491	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768035	5-12-8	O	JULIE SPRINGWATER	NOBLE ENERGY INC	1/8+	850	499	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768036	5-12-8	O	JACK M FOREMAN	NOBLE ENERGY INC	1/8+	850	503	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768037	5-12-8	O	ANITA M MASON	NOBLE ENERGY INC	1/8+	851	5	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768038	5-12-8	O	BONNIE H GRISELL ET VIR	NOBLE ENERGY INC	1/8+	850	646	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1

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Q083768039	5-12-8	O	MARY ELIZABETH VOLTZ ET VIR	NOBLE ENERGY INC	1/8+	850	648	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
Q083768040	5-12-8	O	SCOTT C HARRIS ET UX	NOBLE ENERGY INC	1/8+	851	394	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
Q083768041	5-12-8	O	JACK M FOREMAN	NOBLE ENERGY INC	1/8+	854	178	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
Q083768042	5-12-8	O	JACQUELYN JOHNSON ET VIR	NOBLE ENERGY INC	1/8+	860	523	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
Q083768043	5-12-8	O	ROY JOSEPH LEACH	NOBLE ENERGY INC	1/8+	859	487	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
Q083768044	5-12-8	O	LESLIE ANN BLYTHE ET VIR	NOBLE ENERGY INC	1/8+	860	535	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
Q083768045	5-12-8	O	MURIEL ANNE MILLER ET VIR	NOBLE ENERGY INC	1/8+	860	545	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
Q083768046	5-12-8	O	GREGORY S MILLER ET UX	NOBLE ENERGY INC	1/8+	860	517	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
Q083768047	5-12-8	O	REBECCA L CULLEN ET VIR	NOBLE ENERGY INC	1/8+	860	558	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

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Q083768048	5-12-8	O	FRANCES E RUTLEDGE ET VIR	NOBLE ENERGY INC	1/8+	860	513	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768049	5-12-8	O	LARRY DEAN MCWHORTER ET AL	NOBLE ENERGY INC	1/8+	860	529	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768050	5-12-8	O	LEROY MILLER	NOBLE ENERGY INC	1/8+	860	532	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768051	5-12-8	O	DAVID LEE EVANS JR ET UX	NOBLE ENERGY INC	1/8+	864	187	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768052	5-12-8	O	STEVEN POND ET UX	NOBLE ENERGY INC	1/8+	860	574	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768053	5-12-8	O	IAN KIPP HAGEMANN	NOBLE ENERGY INC	1/8+	860	520	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768054	5-12-8	O	MELISSA MILLER GIBSON ET VIR	NOBLE ENERGY INC	1/8+	869	100	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768055	5-12-8	O	HEATHER D MALO ET VIR	NOBLE ENERGY INC	1/8+	866	336	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768056	5-12-8	O	RODNEY F PETERSON	NOBLE ENERGY INC	1/8+	866	342	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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Q083768057	5-12-8	O	PRISCILLA ANN MILLER HADEN	NOBLE ENERGY INC	1/8+	873	545	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768058	5-12-8	O	DANIEL D HOBBS ET UX	NOBLE ENERGY INC	1/8+	873	543	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768059	5-12-8	O	RICHARD S MULLEN ET UX	NOBLE ENERGY INC	1/8+	869	98	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768060	5-12-8	O	JAMES B CROW ET UX	NOBLE ENERGY INC	1/8+	869	108	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768061	5-12-8	O	GREGORY S CROW	NOBLE ENERGY INC	1/8+	869	106	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768062	5-12-8	O	HAROLD B CROW ET UX	NOBLE ENERGY INC	1/8+	869	102	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768063	5-12-8	O	BRIAN K CROW	NOBLE ENERGY INC	1/8+	869	104	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768064	5-12-8	O	TIMOTHY HOWARD MANCHEGO	NOBLE ENERGY INC	1/8+	873	104	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1
Q083768065	5-12-8	O	KATHLEEN HOBBS YOUNG	NOBLE ENERGY INC	1/8+	869	356	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 Noble Energy Inc to HG Energy II Appalachia LLC: 39/1

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Q083768066	5-12-8	O	DAVID C MULLEN ET UX	NOBLE ENERGY INC	1/8+	869	358	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768067	5-12-8	O	DENNIS FISCHER ET UX	NOBLE ENERGY INC	1/8+	870	360	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768068	5-12-8	O	KATHLEEN A SULLIVAN ET VIR	NOBLE ENERGY INC	1/8+	870	362	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768069	5-12-8	O	FRANCIS F FISCHER ET UX	NOBLE ENERGY INC	1/8+	871	494	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768070	5-12-8	O	JOYCE A FIORILLI ET VIR	NOBLE ENERGY INC	1/8+	873	114	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768071	5-12-8	O	BARBARA L VOGLER ET VIR	NOBLE ENERGY INC	1/8+	873	112	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768072	5-12-8	O	HARRIET C HERMAN ET VIR	NOBLE ENERGY INC	1/8+	873	116	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768073	5-12-8	O	EUGENIA A KERR	NOBLE ENERGY INC	1/8+	873	118	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768074	5-12-8	O	JANE H BARNSTEINER ET UX	NOBLE ENERGY INC	1/8+	873	93	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
Q083768075	5-12-8	O	EDWARD P POWDERLY ET UX	NOBLE ENERGY INC	1/8+	873 91	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768076	5-12-8	O	NORA C POWDERLY	NOBLE ENERGY INC	1/8+	873 89	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768077	5-12-8	O	EILEEN T POWDERLY	NOBLE ENERGY INC	1/8+	873 87	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768078	5-12-8	O	MARY F WEILAND	NOBLE ENERGY INC	1/8+	873 124	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768079	5-12-8	O	JAMES E HERMAN	NOBLE ENERGY INC	1/8+	873 128	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768080	5-12-8	O	ANTHONY T POWDERLY ET UX	NOBLE ENERGY INC	1/8+	878 363	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768081	5-12-8	O	SHARON L SCHOLL	NOBLE ENERGY INC	1/8+	878 379	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768082	5-12-8	O	JAMES T SCHOLL	NOBLE ENERGY INC	1/8+	878 376	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768083	5-12-8	O	ANNE GALBALLY ET VIR	NOBLE ENERGY INC	1/8+	878 354	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
Q083768084	5-12-8	O	CLARK D CHASE ET UX	NOBLE ENERGY INC	1/8+	878	357	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768085	5-12-8	O	BRIDGET A POWDERLY	NOBLE ENERGY INC	1/8+	881	29	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768086	5-12-8	O	NORA K POWDERLY	NOBLE ENERGY INC	1/8+	881	23	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768087	5-12-8	O	KEVIN M POWDERLY	NOBLE ENERGY INC	1/8+	890	518	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768088	5-12-8	O	MARY S SCHOLL	NOBLE ENERGY INC	1/8+	890	569	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768089	5-12-8	O	BRIAN P POWDERLY ET UX	NOBLE ENERGY INC	1/8+	890	563	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768090	5-12-8	O	SUSANNE S QUARTERMAN	NOBLE ENERGY INC	1/8+	890	560	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768091	5-12-8	O	HARRIET C VENTURA ET VIR	NOBLE ENERGY INC	1/8+	894	541	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q083768099	5-12-8	O	EILEEN T POWDERLY	NOBLE ENERGY INC	1/8+	873	81	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
10*21769	5-12-13	P	BETTY HAMILTON	TH EXPLORATION LLC	1/8+	957	419	N/A	N/A	N/A	N/A	N/A	N/A
10*21770	5-12-13	P	SUSAN WINLAND AND PAUL MICHAEL WINLAND	TH EXPLORATION LLC	1/8+	957	421	N/A	N/A	N/A	N/A	N/A	N/A

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*21776	5-12-13	P	LINDA HAMILTON	TH EXPLORATION LLC	1/8+	957	417	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16918	5-12-12.1	Q	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	976	617	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14067	5-14-13	R	REVA FRANZE	GASTAR EXPLORATION USA, INC.	1/8+	666	51	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 23/353	Merger - Gastar Exploration USA Inc into Gastar Exploration Inc: 21/41	Gastar Exploration nc to TH Exploration II LLC: 36/9
10*14911	5-11-15	S	FORREST MILLER	GASTAR EXPLORATION USA INC	1/8+	819	316	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 23/353	Merger - Gastar Exploration USA Inc into Gastar Exploration Inc: 21/41	Gastar Exploration nc to TH Exploration II LLC: 36/9
10*16913	5-11-15	S	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	976	626	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17329	5-11-15	S	JOHN P ICARD AND REVA J ICARD	TH EXPLORATION LLC	1/8+	943	524	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18045	5-11-15	S	KLOVA ANN MORRIS	TH EXPLORATION LLC	1/8+	927	114	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18174	5-11-15	S	THE ESTATE OF ROY JOSEPH LEACH	TH EXPLORATION LLC	1/8+	927	647	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19642	5-11-15	S	NOEL A PARKS	TH EXPLORATION LLC	1/8+	944	92	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21455	5-11-15	S	MELISSA MILLER GIBSON AND JAMES GIBSON	TH EXPLORATION LLC	1/8+	953	308	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21903	5-11-15	S	WILLIAM R VOLTZ AND SHARON VOLTZ	TH EXPLORATION LLC	1/8+	960	182	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21904	5-11-15	S	MARY S MAGERS AND WILLIAMS MAGERS	TH EXPLORATION LLC	1/8+	960	158	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21905	5-11-15	S	DAVID F VOLTZ AND LINDA VOLTZ	TH EXPLORATION LLC	1/8+	961	444	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21906	5-11-15	S	MICHAEL P VOLTZ	TH EXPLORATION LLC	1/8+	960	164	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21910	5-11-15	S	J THOMAS VOLTZ AND NANCY VOLTZ	TH EXPLORATION LLC	1/8+	960	179	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21939	5-11-15	S	ULA F NELSON	TH EXPLORATION LLC	1/8+	960	96	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22134	5-11-15	S	JACK MICHAEL FOREMAN	TH EXPLORATION LLC	1/8+	961	449	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22309	5-11-15	S	AARON D LITMAN AND BETTY J LITMAN	TH EXPLORATION LLC	1/8+	963	408	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22311	5-11-15	S	WILLIAM L LITMAN AND VICKIE L LITMAN	TH EXPLORATION LLC	1/8+	963	404	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22312	5-11-15	S	RICHARD WOOD AND VICKI WOOD	TH EXPLORATION LLC	1/8+	962	528	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22438	5-11-15	S	JULIE SPRINGWATER	TH EXPLORATION LLC	1/8+	964	231	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22559	5-11-15	S	SHARON TOLER WILLIAMS & HERVY WILLIAMS	TH EXPLORATION LLC	1/8+	966	94	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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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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4705102149

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

BOOK 0042 PAGE 0109

STATE OF WEST VIRGINIA §
§
COUNTY OF MARSHALL §

ASSIGNMENT AND CONVEYANCE

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

WITNESSETH:

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

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

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

1. 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.

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

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

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

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WV-ASIR-0009

Jan Pest
MARSHALL County 01:22:38 PM
Instrument No 1403489
Date Recorded 04/27/2016
Document Type ABN
Pages Recorded 77
Book-Page 36-9
Recording Fee \$77.00
Additional \$13.00

4705102149

WHEN RECORDED RETURN TO:
TH Exploration II, LLC
1320 South University Drive, Suite 500
Fort Worth, Texas 76107
Attn: David Kalish

Execution Version

ASSIGNMENT AND BILL OF SALE

STATE OF WV

§
§
§

KNOW ALL MEN BY THESE PRESENTS:

COUNTY OF MARSHALL

THIS ASSIGNMENT AND BILL OF SALE (this "Assignment"), dated April 7, 2016, but effective as of 7:00 A.M. Houston time on January 1, 2016 (the "Effective Time"), is between Gasbar Exploration Inc., a Delaware corporation, whose address is 1331 Lamar Street, Suite 650 Houston, Texas 77010 ("Assignor"), and TH Exploration II, LLC, a Texas limited liability company, whose address is 1320 South University Drive, Suite 500, Fort Worth, Texas 76107 ("Assignee"). Assignor and Assignee are each, individually, referred to herein as a "Party" and, collectively, as the "Parties".

Capitalized terms used but not defined herein shall have the respective meanings set forth in that certain Purchase and Sale Agreement (the "Purchase Agreement"), dated as of February 19, 2016, by and between Assignor and Assignee (as successor-in-interest).

Section 1. Assignment. The conveyance and assignment herein shall be deemed effective as of the Effective Time.

For Ten Dollars (\$10.00) and other good and valuable consideration (the receipt and sufficiency of which are hereby acknowledged), Assignor does hereby GRANT, BARGAIN, SELL, CONVEY, ASSIGN, TRANSFER, SET OVER AND DELIVER unto Assignee, all of Assignor's right, title and interest in and to the following interests and properties (such right, title and interest described in subsections (a) through (b) of this Section 1, less and except the Excluded Assets, collectively, the "Conveyed Interests"):

(a) all oil, gas and/or mineral leases of Assignor, together with any and all other right, title and interest of Assignor in and to the leasehold estates created thereby, including subleases, royalties, overriding royalties, net profits interest, carried interests or similar rights or interests in such leases, and together with all rights, privileges, benefits and powers conferred upon Assignor with respect to the use and occupation of the lands covered thereby that may be necessary, convenient or incidental to the possession and enjoyment of such leases, located in Marshall, Wetzel, Doddridge, Harrison, Lewis, Marion, and Monongalia Counties, West Virginia and Greene, Butler, Fayette, Somerset, and Clearfield Counties, Pennsylvania, including those described on Exhibit A—Part 1 attached hereto (subject to any reservations, limitations or depth restrictions described on Exhibit A—Part 1), (Assignor's interest in such leases and other right, title and interest as so limited, the "Leases");

(b) all rights and interests in, under or derived from all unitization agreements in effect with respect to any of the Leases and the units created thereby, including those described

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4705102149



December 13, 2018

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

RE: Woodford 8HU

Subject: Road Crossing Letter

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Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Woodford 8HU well plat.

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

Sincerely,

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

Amy L. Miller
Permitting Specialist – Appalachia Region

WW-6AC
(1/12)

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

Date of Notice Certification: 12/13/2018

API No. 47- 051 -
Operator's Well No. Woodford 8HU
Well Pad Name: Woodford

Notice has been given:

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

State:	West Virginia	UTM NAD 83	Easting:	516,096.29
County:	Marshall		Northing:	4,406,047.14
District:	Franklin	Public Road Access:	Burch Ridge Road (County Route 26)	
Quadrangle:	Powhatan Point 7.5'	Generally used farm name:	CNX RCPC, LLC	
Watershed:	French Creek - Ohio River (HUC 10)			

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

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

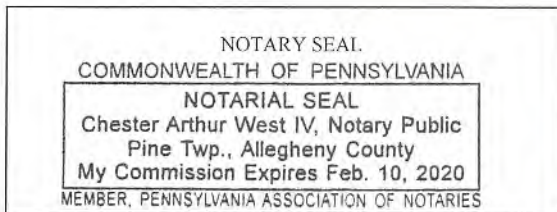
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication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

WW-6AC
(1/12)

Certification of Notice is hereby given:

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>Amy Miller</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permitting Specialist</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 13th day of December 2018

Chester Arthur West IV 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 depprivacyofficer@wv.gov.

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

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

Date of Notice: 12/11/2018 **Date Permit Application Filed:** 12/13/2018

Notice of:

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

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

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

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

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

SURFACE OWNER(s)

Name: CNX Land Resources, LLC Attn: Casey Saunders
Address: 1000 Consol Energy Drive
Canonsburg, PA 15318 (Well Pad)

Name: Woodland Hill Church of God c/o Margirene W. Keefe, Trustee
Address: 8669 Kossuth Amanda Road
Spencerville, OH 45887 (Access Road)

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

Name: Linda E. Hamilton (Access Road) * See attached list
Address: 651 Farmall Lane
Proctor, WV 26055 (*See attached list)
Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
Address: _____

COAL OWNER OR LESSEE

Name: Murray Energy Corporation
Address: 46226 National Park Road W
St. Clairsville, OH 43950 (*See attached list)

COAL OPERATOR

Name: _____
Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)

Name: *See attached list
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: _____
Address: _____

*Please attach additional forms if necessary

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API NO. 44705102149
OPERATOR WELL NO. Woodford 8HU
Well Pad Name: Woodford

Notice is hereby given:

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

This Notice Shall Include:

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

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

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

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

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

Well Location Restrictions

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

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

Water Well Testing:

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

Water Testing Laboratories:

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

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

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

Written Comment:

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

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

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

Time Limits and Methods for Filing Comments.

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

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

Comment Requirements

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

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

Permit Denial or Condition

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

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

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

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

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Environmental Protection

WW-6A
(8-13)

4705102149

API NO. 47-051

OPERATOR WELL NO. Woodford 8HU

Well Pad Name: Woodford

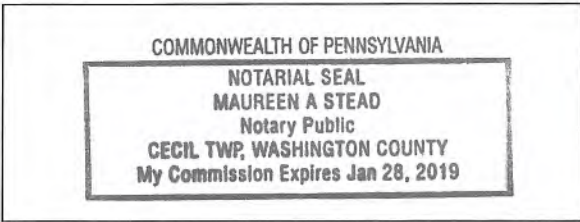
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hill.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 of your personal information, please contact DEP's Chief Privacy Officer at deprivacyofficer@wv.gov.



Subscribed and sworn before me this 11 day of DEC. 2018.

Maureen A Stead Notary Public

My Commission Expires 1/28/19

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Environmental Protection

4705102149

WW-6A Additional Parties to Notice Information

Well: Woodford 8HU

Surface Owners (Access Road)

Edward L. Gibson (Life) Gary E. Gibson (Remainder) 1200 Burch Ridge Road Proctor, WV 26055	Susan Winland and Paul M. Winland 18 Happy Trails Lane Moundsville, WV 26041
Betty J. Hamilton 622 Farmall Lane Proctor, WV 26055	Robert W. Jr. and Wendy L. Riggerbach 1048 Burch Ridge Road Proctor, WV 26055
Robert W. and Sharon Riggerbach 228 Farmall Lane Proctor, WV 26055	Raymond K. and Michele A. Miller 554 Farmall Lane Proctor, WV 26055
Anita Rae Miller – Life Estate 400 Filbert Avenue Moundsville, WV 26041	Raymond K. Miller (Remainder) 554 Farmall Lane Proctor, WV 26055
Gregg A. Miller (Remainder) 304 W. Brentwood Avenue Moundsville, WV 26041	Gerald L. Miller (Remainder) 95 Bills Lane Moundsville, WV 26041

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WW-6A

Supplement Pg. 1A

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

WATER WELL REPORT

Well: WOODFORD 8HU
 District: Franklin
 County: Marshall
 State: WV

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WV Department of
 Environmental Protection

There appears to be Eighteen (18) possible water sources within 2,000 feet of the above referenced well location.

Topo Spot # 1 TM 7A Par. 26 Albert Joseph White Est. c/o Orpha Ross 304-845-4130 201 Tomlinson Ave. Moundsville, WV 26041	Topo Spot # 2 TM 7A Par. 27 Paul W. Barrett 304-312-1975 101 Washington Lands Rd. (Apt. E6) Moundsville, WV 26041	Topo Spot # 3 TM 7A Par. 21 David A. Beyser 304-845-4347 76 Rolling Acres Moundsville, WV 26041
Topo Spot # 4 TM 7A Par. 20 Betty Sexton 208-888-1776 41 Dixie Ln. Wellsburg, WV 26070	Topo Spot # 5 TM 7A Par. 19 Shelia R. Rutan 304-905-4379 411 Magnolia Ave. Moundsville, WV 26041	Topo Spot # 6 TM 7A Par. 17 Carol Martin & Harry Yoho 843-384-3277 8724 Proctor Creek Rd. Proctor, WV 26055
Topo Spot # 7 TM 7A Par. 2 CNX RCPC, LLC 724-485-4000 1000 Consol Energy Dr. Canonsburg, PA 15317	Topo Spot # 8 TM 7A Par. 1 Lucille Meyers 139 Graysville Rd. Proctor, WV 26055	Topo Spot # 9 TM 7B Par. 25 Cindy D. Aliff 304-771-1088 34 Steelton St. New Martinsville, WV 26155
Topo Spot # 10 TM 7B Par. 26 Cindy D. Aliff 304-771-1088 34 Steelton St. New Martinsville, WV 26155	Topo Spot # 11 TM 7B Par. 29 Patricia A. Johnson 304-376-1338 171 Graysville Rd. Proctor, WV 26055	Topo Spot # 12 TM 7B Par. 33 Albert J. Anderson Jr. 216-288-1266 227 Graysville Rd. Proctor, WV 26055

4705102149

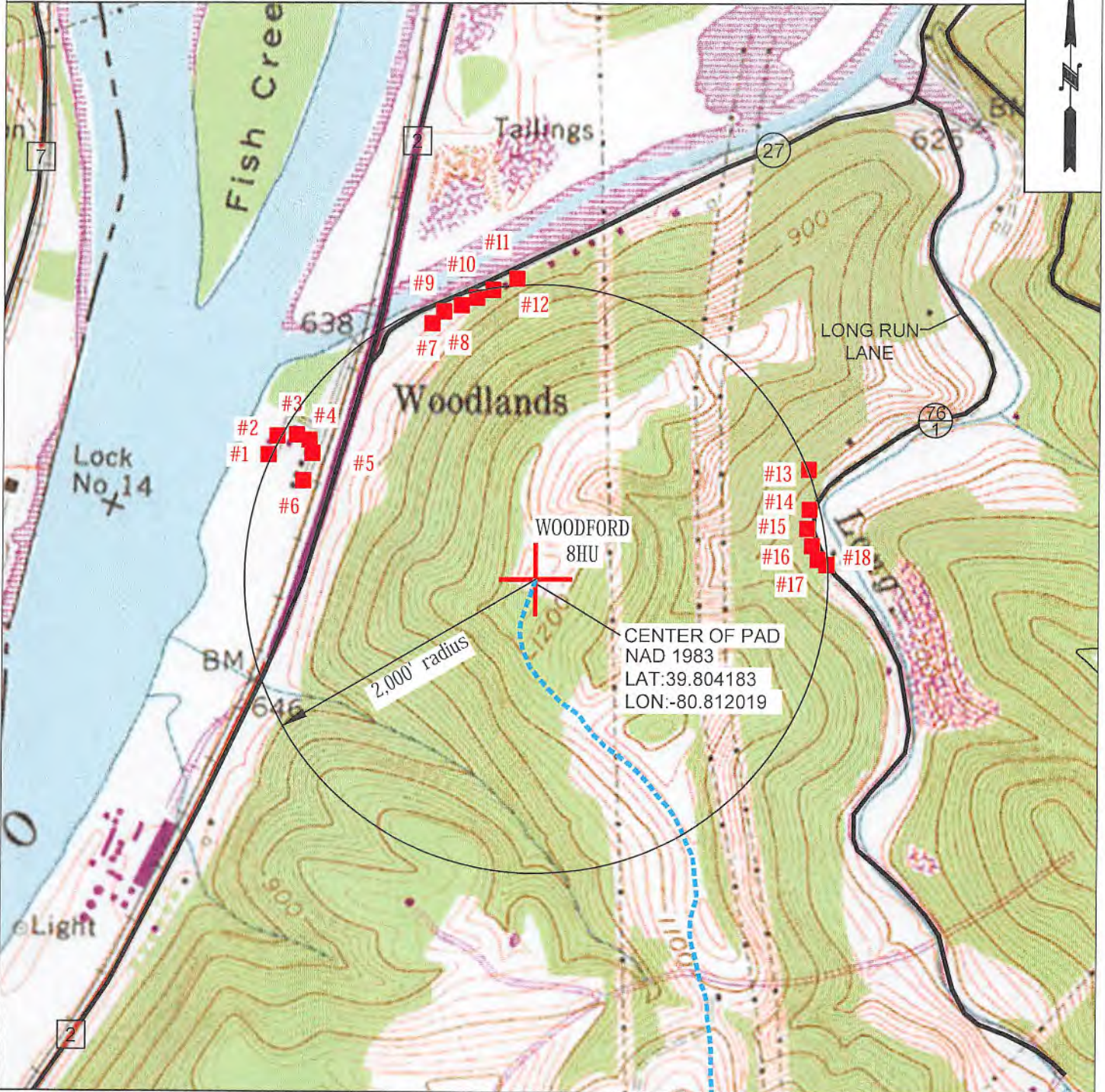
Topo Spot # 13 TM 7 Par. 42.1 Holly Rice 304-843-2212 657 Long Run Rd. Proctor, WV 26055	Topo Spot # 14 TM 7 Par. 44 Crystal B. Darrah 304-280-6747 703 W. Brentwood Ave. Moundsville, WV 26041	Topo Spot # 15 TM 7 Par. 44 Crystal B. Darrah 304-280-6747 703 W. Brentwood Ave. Moundsville, WV 26041
Topo Spot # 16 TM 7 Par. 42.2 Steven & Rhonda Lloyd 304-843-0171 743 Long Run Ln. Proctor, WV 26055	Topo Spot # 17 TM 7 Par. 42.3 Joshua David Hartley 304-845-1399 759 Long Run Ln, Proctor, WV 26055	Topo Spot # 18 TM 7 Par. 42 Tracy M. Kesterson 304-830-7356 773 Long Run Ln Proctor, WV

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There appears to be Eighteen (18) possible water sources within 2,000'.



 <p>TUG HILL OPERATING</p>	OPERATOR	494510851	TOPO SECTION	LEASE NAME
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	WOODFORD
			SCALE:	DATE:
			1" = 1000'	DATE: 07-27-2018

WW-6A3
(1/12)

Operator Well No. Woodford 8HU

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: 6/11/2018 **Date of Planned Entry:** 6/18/2018

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

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

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

Notice is hereby provided to:

SURFACE OWNER(S)

Name: CNX Land Resources, LLC Attn: Casey Saunders

Address: 1000 Consol Energy Drive

Canonsburg, PA 15318 (Well Pad)

Name: Woodland Hill Church of God c/o Margirene W. Keefe, Trustee

Address: 8669 Kossuth Amanda Road

Spencerville, OH 45887 (Access Road)

Name: Linda E. Hamilton (Access Road)

Address: 651 Farnall Lane

Proctor, WV 26055 (*See attached list)

COAL OWNER OR LESSEE

Name: Murray Energy Corporation

Address: 46226 National Park Road W

St. Clairsville, OH 43950 (*See attached list)

MINERAL OWNER(S)

Name: HG Energy II Appalachia, LLC

Address: 5260 Dupont Road

Parkersburg, WV 26101 (*See attached list)

*please attach additional forms if necessary

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Notice is hereby given:

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

State: West Virginia

County: Marshall

District: Franklin

Quadrangle: Powhatan Point

Approx. Latitude & Longitude: 39.80419523 ; -80.81200643

Public Road Access: Burch Ridge Road - County Route 29

Watershed: Fish Creek - Ohio River (HUC 10)

Generally used farm name: _____

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

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC

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.

WW-6A3 Additional Parties to Notice Information

4705102149

Well: Woodford 8HU

Surface Owners (Access Road)

Edward L. Gibson (Life) Gary E. Gibson (Remainder) 1200 Burch Ridge Road Proctor, WV 26055	Susan Winland and Paul M. Winland 18 Happy Trails Lane Moundsville, WV 26041
Betty J. Hamilton 622 Farmall Lane Proctor, WV 26055	Robert W. Jr. and Wendy L. Riggerbach 1048 Burch Ridge Road Proctor, WV 26055
Robert W. and Sharon Riggerbach 228 Farmall Lane Proctor, WV 26055	Raymond K. and Michele A. Miller 554 Farmall Lane Proctor, WV 26055
Anita Rae Miller – Life Estate 400 Filbert Avenue Moundsville, WV 26041	Raymond K. Miller (Remainder) 554 Farmall Lane Proctor, WV 26055
Gregg A. Miller (Remainder) 304 W. Brentwood Avenue Moundsville, WV 26041	Gerald L. Miller (Remainder) 95 Bills Lane Moundsville, WV 26041

Mineral Owners (Well Pad)

CNX Land Resources, LLC
Attn: Casey Saunders
1000 Consol Energy Drive
Canonsburg, PA 15318

Coal Owners (Well Pad)

CNX Land Resources, LLC
Attn: Casey Saunders
1000 Consol Energy Drive
Canonsburg, PA 15318

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Environmental Protection

WW-6A5
(1/12)

Operator Well No. Woodford 8HU

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: 12/13/2018 **Date Permit Application Filed:** 12/13/2018

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

CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

WV Department of
Environmental Protection

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: CNX Land Resources, LLC Attn: Casey Saunders

Address: 1000 Consol Energy Drive

Canonsburg, PA 15317 (Well Pad)

Name: Woodland Hill Church of God c/o Margirene W. Keefe, Trustee

Address: 8669 Kossuth Amanda Road

Spencerville, OH (Access Road) * See Attached List

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>516,096.29</u>
County:	<u>Marshall</u>		Northing:	<u>4,406,047.14</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Burch Ridge Road (County Route 29)</u>	
Quadrangle:	<u>Powhatan Point 7.5'</u>	Generally used farm name:	<u>CNX RCPC, LLC</u>	
Watershed:	<u>French Creek - Ohio River (HUC 10)</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 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

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

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-749-8388

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.

WW-6A5 Additional Parties to Notice Information

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Surface Owners (Access Road)

Edward L. Gibson (Life) Gary E. Gibson (Remainder) 1200 Burch Ridge Road Proctor, WV 26055	Susan Winland and Paul M. Winland 18 Happy Trails Lane Moundsville, WV 26041
Betty J. Hamilton 622 Farmall Lane Proctor, WV 26055	Robert W. Jr. and Wendy L. Riggenschach 1048 Burch Ridge Road Proctor, WV 26055
Robert W. and Sharon Riggenschach 228 Farmall Lane Proctor, WV 26055	Raymond K. and Michele A. Miller 554 Farmall Lane Proctor, WV 26055
Anita Rae Miller – Life Estate 400 Filbert Avenue Moundsville, WV 26041	Raymond K. Miller (Remainder) 554 Farmall Lane Proctor, WV 26055
Gregg A. Miller (Remainder) 304 W. Brentwood Avenue Moundsville, WV 26041	Gerald L. Miller (Remainder) 95 Bills Lane Moundsville, WV 26041
Linda E. Hamilton 651 Farmall Lane Proctor, WV 26055	

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

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

Jill M. Newman
Deputy Commissioner

June 19, 2018

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

Subject: DOH Permits for the Woodford Well Pad, Marshall County

Woodford 8HU

Dear Mr. Martin,

This well site will be accessed from Permit #06-2018-0460 issued to Tug Hill Operating for access to the State Road for a well site located off of Marshall County Route 29 SLS.

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

Very Truly Yours,

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

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PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

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

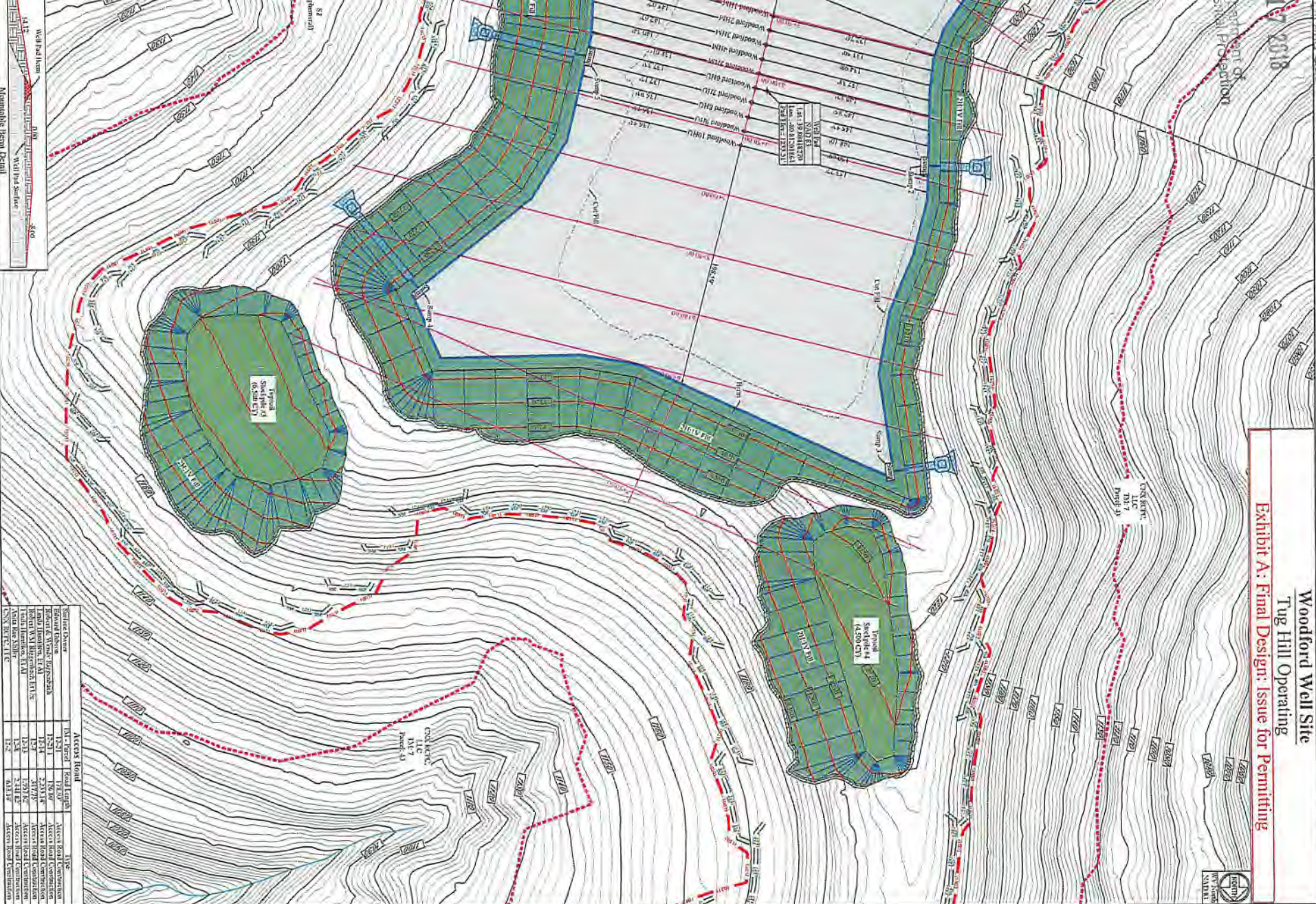
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DEC 17 2018

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Environmental Protection

Woodford Well Site
Tug Hill Operating

Exhibit A: Final Design: Issue for Permitting



Sheet Number	Access Road	Foot Length	Type
Woodford Well Site	WV-100	1750'	Access Road Construction
Woodford Well Site	WV-101	2250'	Access Road Construction
Woodford Well Site	WV-102	2175'	Access Road Construction
Woodford Well Site	WV-103	2175'	Access Road Construction
Woodford Well Site	WV-104	2175'	Access Road Construction
Woodford Well Site	WV-105	2175'	Access Road Construction
Woodford Well Site	WV-106	2175'	Access Road Construction
Woodford Well Site	WV-107	2175'	Access Road Construction
Woodford Well Site	WV-108	2175'	Access Road Construction
Woodford Well Site	WV-109	2175'	Access Road Construction
Woodford Well Site	WV-110	2175'	Access Road Construction
Woodford Well Site	WV-111	2175'	Access Road Construction
Woodford Well Site	WV-112	2175'	Access Road Construction
Woodford Well Site	WV-113	2175'	Access Road Construction
Woodford Well Site	WV-114	2175'	Access Road Construction
Woodford Well Site	WV-115	2175'	Access Road Construction
Woodford Well Site	WV-116	2175'	Access Road Construction
Woodford Well Site	WV-117	2175'	Access Road Construction
Woodford Well Site	WV-118	2175'	Access Road Construction
Woodford Well Site	WV-119	2175'	Access Road Construction
Woodford Well Site	WV-120	2175'	Access Road Construction

Site Plan
Woodford Well Site
Franklin District
Marshall County, WV



Date: 07/24/2018
Scale: AS Shown
Designed By: ZS
File No.
Sheet 19 of 26

THIS DOCUMENT
PREPARED FOR
TUG HILL
OPERATING

Date	Revision
07-24-2018 <td>Design</td>	Design
08-07-2018	Design: WVDEP Comments