



west virginia department of environmental protection

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

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

Wednesday, September 12, 2018
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BOULEVARD, PLAZA II
SUITE 200
CANNONSBURG, PA 15317

Re: Permit approval for WOODFORD 5HM
47-051-02075-00-00

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 5HM
Farm Name: CNX RCPC, LLC
U.S. WELL NUMBER: 47-051-02075-00-00
Horizontal 6A New Drill
Date Issued: 9/12/2018

PERMIT CONDITIONS

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

CONDITIONS

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.

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 5HM Well Pad Name: Woodford

3) Farm Name/Surface Owner: CNX RCPC, 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 x Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow x Deep _____
Horizontal x _____

6) Existing Pad: Yes or No No *JW 8/27/18*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6340' - 6390', thickness of 50' and an anticipated approx. pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6490'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 17,874'

11) Proposed Horizontal Leg Length: 10,600'

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

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

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 778' and Pittsburgh Coal - 866'

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 x

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

18)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	30"	NEW	BW	BW	120'	120'	259ft^3(CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	910'	910'	982ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	910'	910'	982ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2600'	2600'	861ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	17,874'	17,874'	4558ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#	6,875'		
Liners							

JW 8/27/18

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

PACKERS

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

JW 8/27/18

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

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

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

Well to be completed with approximately 26,500,000 lb. proppant and 409,709 barrels of water. Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 44.60 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 other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

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

*See attachment

25) Proposed borehole conditioning procedures:

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

*Note: Attach additional sheets as needed.

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

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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

Permit well - Woodford-5HM

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
4705100112	JT McIntire	1485	None, Open hole completion targeting the Price formation	None	No, This is an old, plugged, shallow well that is too shallow to be within frac propagation from a Marcellus well	Well was plugged in 1940. A field survey was conducted to locate this well and it was found plugged at the location shown on the well plat.

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Select County: (051) Marshall Select datatypes: (Check All)

Enter Permit #: 00112

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

Get Data Reset

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

WV Geological & Economic Survey:

Well: County = 51 Permit = 00112

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTME	UTMN
4705100112	Marshall	112	Franklin	Powhatan Point	Clenington	39.752953	-80.60069	517064.3	4404796.4

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4705100112	11/5/1940	Original Loc	Completed	William C Stoper	1				William C Stoper	McIntire, J. T.			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD
4705100112	11/5/1940	10/11/1940	720	Ground Level	Unnamed	Price Fm & equivs	Price Fm & equivs	Development Well	Unsuccessful	Dry w/ Gas Show	unknown	Nat/Open H	1465		1435	

Pay/Show/Water Information:

API	CMP_DT	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOT	FM_BOT	G_BEF	G_AFT	O_BEF	O_AFT	WATER_QNTY
4705100112	11/5/1940	Water	Fresh Water	Vertical			40						0
4705100112	11/5/1940	Water	Salt Water	Vertical			440						0

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

Stratigraphy Information:

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV	DATUM
4705100112	Original Loc	Sewickley coal	Well Record	211	Reasonable	3	Reasonable	720	Ground Level
4705100112	Original Loc	Pittsburgh coal	Well Record	268	Reasonable	4	Reasonable	720	Ground Level
4705100112	Original Loc	Salt Sands (undiff)	Well Record	975	Reasonable	42	Reasonable	720	Ground Level
4705100112	Original Loc	Greenbrier Group	Well Record	1320	Reasonable	66	Reasonable	720	Ground Level
4705100112	Original Loc	Big Lime	Well Record	1330	Reasonable	66	Reasonable	720	Ground Level
4705100112	Original Loc	Big Injun (Pricedec)	Well Record	1356	Reasonable	0	Reasonable	720	Ground Level

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

Plugging Information:

API	PLG_DT	DEPTH_PBT
4705100112	11/5/1940	0

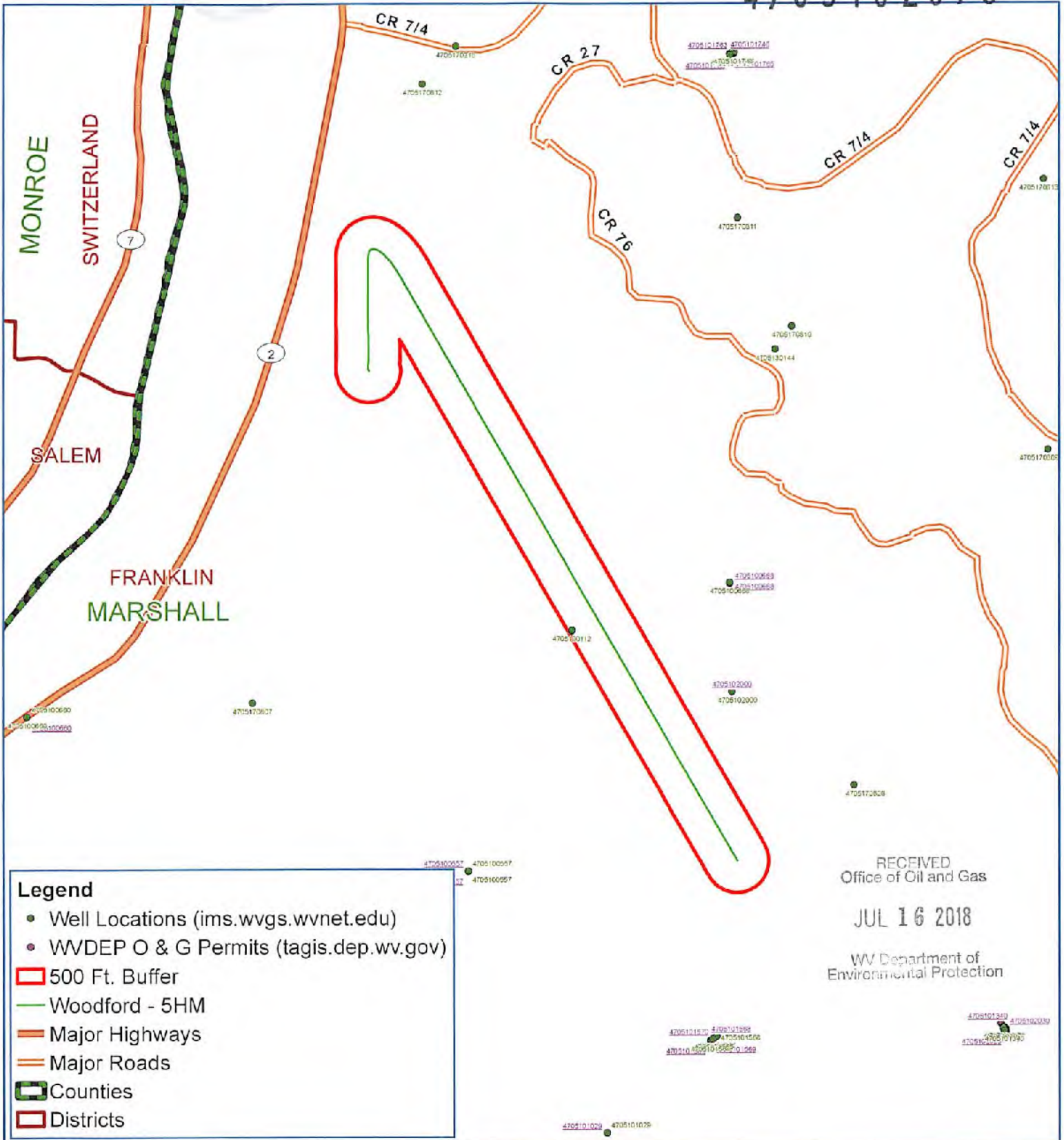
There is no Sample data for this well

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4705102075



Legend

- Well Locations (ims.wvgs.wvnet.edu)
- WVDEP O & G Permits (tagis.dep.wv.gov)
- ▭ 500 Ft. Buffer
- Woodford - 5HM
- Major Highways
- Major Roads
- ▭ Counties
- ▭ Districts

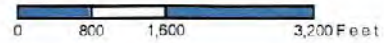
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Woodford - 5HM Franklin District Marshall County, WV

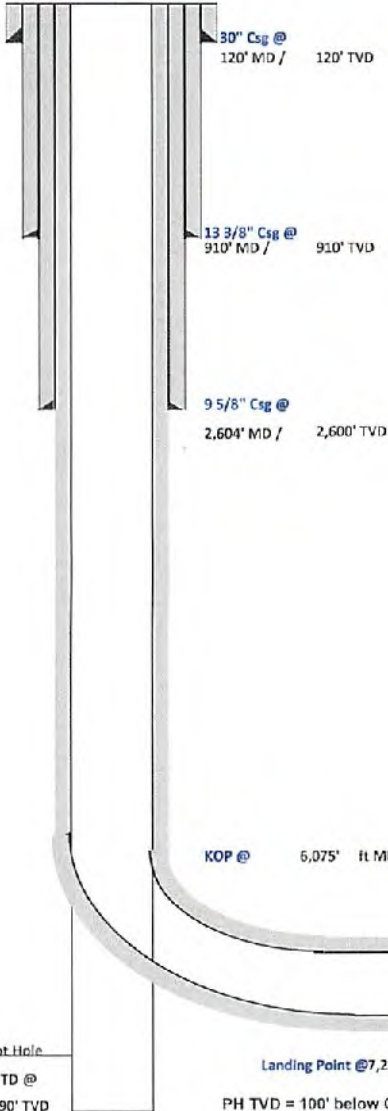


Notes:
All locations are approximate and are for visualization purposes only.





WELL NAME: Woodford-SHM
STATE: WV **COUNTY:** Marshall
DISTRICT: Franklin
DF Elev: 1,235' **GL Elev:** 1,235'
TD: 17,874'
TH Latitude: 39.80414463
TH Longitude: -80.81199542
BH Latitude: 39.78300982
BH Longitude: -80.79148284



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	805
Sewickley Coal	701
Pittsburgh Coal	799
Big Lime	2082
Weir	2470
Berea	2596
Gordon	2819
Rhinstreet	5788
Genesee/Burkett	6169
Tully	6254
Hamilton	6279
Marcellus	6340
Landing Depth	6373
Onondaga	6390
Pilot Hole Depth	6490

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	910'	910'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,604'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	17,874'	6,558'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	985	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	849	A	15	Air	1 Centralizer every other jt
Production	4,022	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

Pilot Hole
 PH TD @
 6,490' TVD

Landing Point @ 7,274' MD / 6,373' TVD
 PH TVD = 100' below Onondaga Top

Lateral TD @ 17,874' ft MD
 6,558' ft TVD

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Handwritten signature and date: 7/15/18

47051-02075



4705 + 02075

Tug Hill Operating, LLC Casing and Cement Program

Woodford-5HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	910'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,604'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	17,874'	CTS

Cement

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

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Well: Woodford 05HM (E)
 Site: Woodford
 Project: Marshall County, West Virginia.
 Design: rev1
 SECTION DETAILS

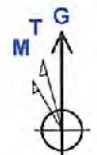
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1550.00	5.00	315.00	1549.68	7.71	-7.71	2.00	315.00	-10.79	Begin 2°/100' build/turn
4	1744.23	5.00	0.77	1743.25	22.16	-13.58	2.00	112.81	-25.88	Begin 5.00° tangent
5	3106.16	5.00	0.77	3100.00	140.85	-11.99	0.00	0.00	-119.77	Begin 6°/100' build
6	3626.08	35.19	359.92	3580.69	321.50	-11.91	6.00	-0.97	-264.09	Begin 35.19° tangent
7	6075.38	35.19	359.92	5557.33	1757.86	-14.03	0.00	0.00	-1421.27	Begin 10°/100' drop/build/turn
8	7273.85	89.00	150.00	6373.00	1495.44	479.70	10.00	144.91	-906.77	Begin 89.00° lateral
9	17873.85	89.00	150.00	6558.00	-7863.03	5776.89	0.00	0.00	9613.76	PBHL/TD 17873.85 MD/6558.00 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 @ 1235.00'L

Northing: 14455471.28 Easting: 1693217.65 Latitude: 39.60414463 Longitude: -80.81199542

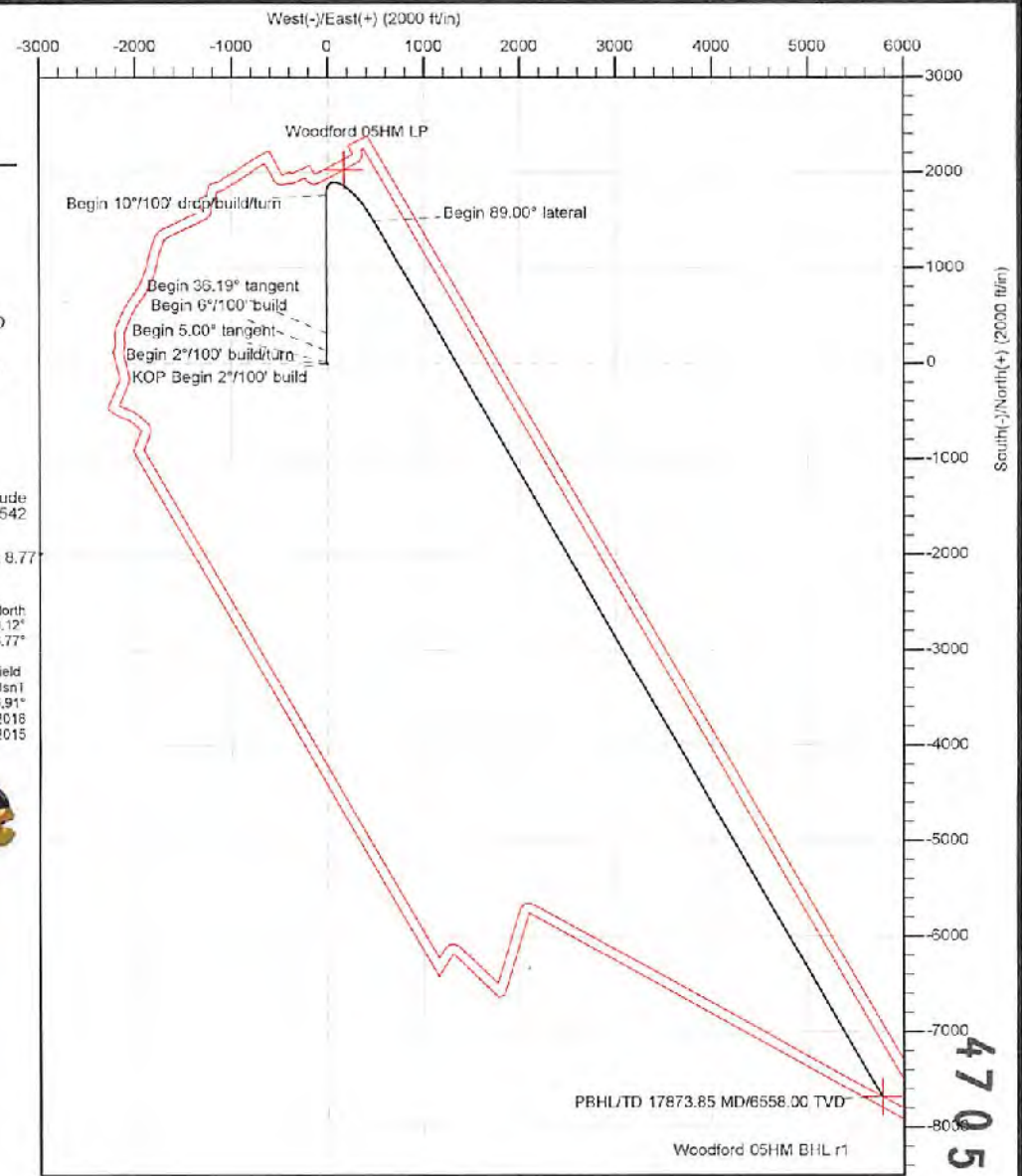
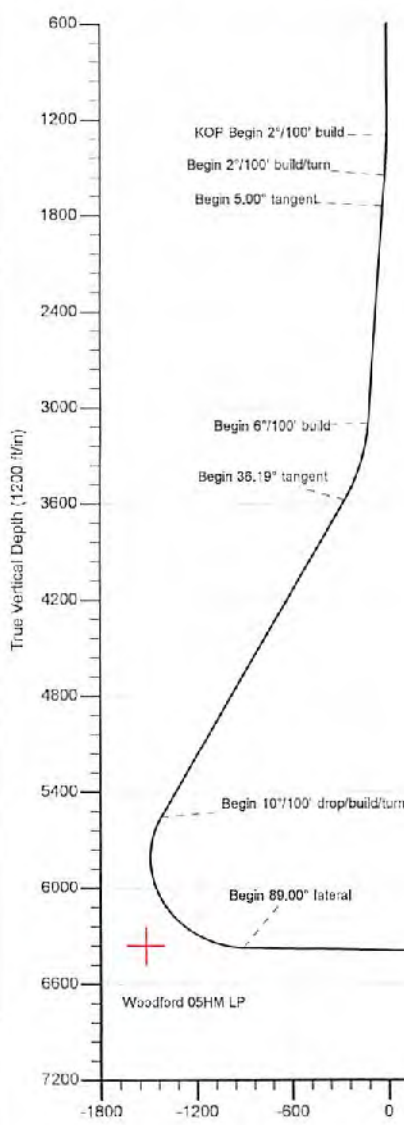
Total Corr (MTR) Convert a Magnetic Direction to a Grid Direction, Subtract 8.77°



Azimuths to Grid North:
 True North: -0.12°
 Magnetic North: -8.77°
 Magnetic Field:
 Strength: 52090.3nT
 Dip Angle: 66.91°
 Date: 5/12/2018
 Model: IGRF2015



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4705102075

PBHL/TD 17873.85 MD/6558.00 TVD

Woodford 05HM BHL r1

Vertical Section at 143.05° (1200 ft/in)

Database:	DB_Jul2218dt_v14	Local Co-ordinate Reference:	Well Woodford 05HM (E)
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 05HM (E)	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)		

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 05HM (E)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,471.29 usft	Latitude:	39.80414463
	+E/-W	0.00 ft	Easting:	1,693,217.66 usft	Longitude:	-80.81199542
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	52,090.31105956

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	143.05	

Plan Survey Tool Program	Date 5/19/2018				
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	17,873.85 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	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,550.00	5.00	315.00	1,549.68	7.71	-7.71	2.00	2.00	0.00	315.00	
1,744.23	5.00	0.77	1,743.25	22.16	-13.58	2.00	0.00	23.56	112.81	
3,106.16	5.00	0.77	3,100.00	140.85	-11.99	0.00	0.00	0.00	0.00	
3,626.08	36.19	359.92	3,580.69	321.50	-11.91	6.00	6.00	-0.16	-0.97	
6,075.38	36.19	359.92	5,557.33	1,767.88	-14.03	0.00	0.00	0.00	0.00	
7,273.85	89.00	150.00	6,373.00	1,495.44	479.70	10.00	4.41	12.52	144.91	
17,873.85	89.00	150.00	6,558.00	-7,683.03	5,778.89	0.00	0.00	0.00	0.00	Woodford 05HM BHL

JUL 16 2018



Planning Report - Geographic

4705 02075
West Virginia Department of Environmental Protection

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 05HM (E)
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 05HM (E)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
100.00	0.00	0.00	100.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
200.00	0.00	0.00	200.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
300.00	0.00	0.00	300.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
400.00	0.00	0.00	400.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
500.00	0.00	0.00	500.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
600.00	0.00	0.00	600.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
700.00	0.00	0.00	700.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
800.00	0.00	0.00	800.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
900.00	0.00	0.00	900.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,455,471.29	1,693,217.66	39.80414463	-80.81199542	
KOP Begin 2°/100' build										
1,400.00	2.00	315.00	1,399.98	1.23	-1.23	14,455,472.52	1,693,216.42	39.80414803	-80.81199981	
1,500.00	4.00	315.00	1,499.84	4.93	-4.93	14,455,476.22	1,693,212.72	39.80415821	-80.81201295	
1,550.00	5.00	315.00	1,549.68	7.71	-7.71	14,455,479.00	1,693,209.95	39.80416585	-80.81202281	
Begin 2°/100' build/turn										
1,600.00	4.70	326.31	1,599.50	10.95	-10.39	14,455,482.24	1,693,207.27	39.80417478	-80.81203232	
1,700.00	4.73	350.83	1,699.18	18.44	-13.32	14,455,489.72	1,693,204.34	39.80419534	-80.81204270	
1,744.23	5.00	0.77	1,743.25	22.16	-13.58	14,455,493.45	1,693,204.08	39.80420557	-80.81204362	
Begin 5.00° tangent										
1,800.00	5.00	0.77	1,798.81	27.02	-13.52	14,455,498.31	1,693,204.14	39.80421892	-80.81204335	
1,900.00	5.00	0.77	1,898.43	35.74	-13.40	14,455,507.03	1,693,204.26	39.80424285	-80.81204286	
2,000.00	5.00	0.77	1,998.04	44.45	-13.28	14,455,515.74	1,693,204.37	39.80426679	-80.81204238	
2,100.00	5.00	0.77	2,097.66	53.17	-13.17	14,455,524.45	1,693,204.49	39.80429072	-80.81204190	
2,200.00	5.00	0.77	2,197.28	61.88	-13.05	14,455,533.17	1,693,204.61	39.80431465	-80.81204142	
2,300.00	5.00	0.77	2,296.90	70.60	-12.93	14,455,541.88	1,693,204.73	39.80433858	-80.81204094	
2,400.00	5.00	0.77	2,396.52	79.31	-12.81	14,455,550.60	1,693,204.84	39.80436252	-80.81204045	
2,500.00	5.00	0.77	2,496.14	88.03	-12.70	14,455,559.31	1,693,204.95	39.80438645	-80.81203997	
2,600.00	5.00	0.77	2,595.76	96.74	-12.58	14,455,568.03	1,693,205.08	39.80441038	-80.81203949	
2,700.00	5.00	0.77	2,695.38	105.46	-12.46	14,455,576.74	1,693,205.19	39.80443431	-80.81203901	
2,800.00	5.00	0.77	2,795.00	114.17	-12.35	14,455,585.46	1,693,205.31	39.80445825	-80.81203852	
2,900.00	5.00	0.77	2,894.62	122.89	-12.23	14,455,594.17	1,693,205.43	39.80448218	-80.81203804	
3,000.00	5.00	0.77	2,994.24	131.60	-12.11	14,455,602.89	1,693,205.55	39.80450611	-80.81203756	
3,100.00	5.00	0.77	3,093.86	140.31	-11.99	14,455,611.60	1,693,205.66	39.80453004	-80.81203708	
3,106.16	5.00	0.77	3,100.00	140.85	-11.99	14,455,612.14	1,693,205.67	39.80453152	-80.81203705	
Begin 6°/100' build										
3,200.00	10.63	0.25	3,192.93	153.61	-11.89	14,455,624.69	1,693,205.76	39.80456654	-80.81203662	
3,300.00	16.63	0.08	3,290.07	177.16	-11.83	14,455,648.45	1,693,205.83	39.80463123	-80.81203623	
3,400.00	22.63	0.00	3,384.21	210.74	-11.81	14,455,682.03	1,693,205.85	39.80472344	-80.81203590	
3,500.00	28.63	359.96	3,474.33	253.97	-11.83	14,455,725.26	1,693,205.83	39.80484218	-80.81203564	
3,600.00	34.63	359.92	3,559.44	306.39	-11.88	14,455,777.68	1,693,205.77	39.80498613	-80.81203545	
3,626.08	36.19	359.92	3,580.69	321.50	-11.91	14,455,792.79	1,693,205.75	39.80502763	-80.81203541	
Begin 36.19° tangent										
3,700.00	36.19	359.92	3,640.35	365.15	-11.97	14,455,836.44	1,693,205.69	39.80514751	-80.81203531	
3,800.00	36.19	359.92	3,721.05	424.21	-12.06	14,455,895.49	1,693,205.60	39.80530969	-80.81203518	
3,900.00	36.19	359.92	3,801.75	483.26	-12.14	14,455,954.55	1,693,205.51	39.80547186	-80.81203505	
4,000.00	36.19	359.92	3,882.45	542.31	-12.23	14,456,013.60	1,693,205.43	39.80563403	-80.81203492	
4,100.00	36.19	359.92	3,963.16	601.36	-12.32	14,456,072.65	1,693,205.34	39.80579621	-80.81203478	
4,200.00	36.19	359.92	4,043.86	660.42	-12.41	14,456,131.70	1,693,205.25	39.80595838	-80.81203465	
4,300.00	36.19	359.92	4,124.56	719.47	-12.49	14,456,190.76	1,693,205.17	39.80612056	-80.81203452	
4,400.00	36.19	359.92	4,205.26	778.52	-12.58	14,456,249.81	1,693,205.06	39.80628273	-80.81203439	



Planning Report - Geographic

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WV Department of
Environmental Protection

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 05HM (E)
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 05HM (E)	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	
4,500.00	36.19	359.92	4,285.96	837.57	-12.67	14,456,306.86	1,693,204.99	39.80644491	-80.81203426	
4,600.00	36.19	359.92	4,366.66	896.63	-12.75	14,456,367.91	1,693,204.90	39.80660708	-80.81203412	
4,700.00	36.19	359.92	4,447.37	955.68	-12.84	14,456,426.96	1,693,204.82	39.80676925	-80.81203399	
4,800.00	36.19	359.92	4,528.07	1,014.73	-12.93	14,456,486.02	1,693,204.73	39.80693143	-80.81203386	
4,900.00	36.19	359.92	4,608.77	1,073.78	-13.01	14,456,545.07	1,693,204.64	39.80709360	-80.81203373	
5,000.00	36.19	359.92	4,689.47	1,132.84	-13.10	14,456,604.12	1,693,204.56	39.80725578	-80.81203359	
5,100.00	36.19	359.92	4,770.17	1,191.89	-13.19	14,456,663.17	1,693,204.47	39.80741795	-80.81203346	
5,200.00	36.19	359.92	4,850.88	1,250.94	-13.27	14,456,722.23	1,693,204.38	39.80758012	-80.81203333	
5,300.00	36.19	359.92	4,931.58	1,309.99	-13.36	14,456,781.28	1,693,204.30	39.80774230	-80.81203320	
5,400.00	36.19	359.92	5,012.28	1,369.05	-13.45	14,456,840.33	1,693,204.21	39.80790447	-80.81203307	
5,500.00	36.19	359.92	5,092.98	1,428.10	-13.53	14,456,899.38	1,693,204.12	39.80806665	-80.81203293	
5,600.00	36.19	359.92	5,173.68	1,487.15	-13.62	14,456,958.44	1,693,204.04	39.80822882	-80.81203280	
5,700.00	36.19	359.92	5,254.39	1,546.20	-13.71	14,457,017.49	1,693,203.95	39.80839100	-80.81203267	
5,800.00	36.19	359.92	5,335.09	1,605.26	-13.80	14,457,076.54	1,693,203.86	39.80855317	-80.81203254	
5,900.00	36.19	359.92	5,415.79	1,664.31	-13.88	14,457,135.59	1,693,203.77	39.80871534	-80.81203241	
6,000.00	36.19	359.92	5,496.49	1,723.36	-13.97	14,457,194.65	1,693,203.69	39.80887752	-80.81203227	
6,075.38	36.19	359.92	5,557.33	1,767.87	-14.03	14,457,239.16	1,693,203.62	39.80899976	-80.81203217	
Begin 10°/100' drop/build/turn										
6,100.00	34.21	2.43	5,577.44	1,782.06	-13.75	14,457,253.34	1,693,203.91	39.80903872	-80.81203106	
6,200.00	26.84	15.86	5,663.63	1,831.98	-6.37	14,457,303.27	1,693,211.29	39.80917578	-80.81200440	
6,300.00	21.50	36.73	5,754.99	1,868.48	10.81	14,457,339.77	1,693,228.46	39.80927591	-80.81194286	
6,400.00	18.90	64.92	5,848.76	1,890.44	37.25	14,457,361.72	1,693,254.91	39.80933606	-80.81184863	
6,500.00	22.65	91.41	5,942.09	1,897.19	72.17	14,457,368.48	1,693,289.82	39.80935441	-80.81172426	
6,600.00	28.97	109.68	6,032.14	1,888.54	114.49	14,457,359.82	1,693,332.14	39.80933039	-80.81157363	
6,700.00	36.72	121.42	6,116.17	1,864.73	162.93	14,457,336.02	1,693,380.58	39.80926474	-80.81140132	
6,800.00	45.26	129.40	6,191.64	1,826.51	216.01	14,457,297.79	1,693,433.67	39.80915945	-80.81121256	
6,900.00	54.21	135.28	6,256.24	1,775.02	272.14	14,457,246.30	1,693,489.79	39.80901772	-80.81101310	
7,000.00	63.38	139.94	6,308.02	1,711.83	329.59	14,457,183.11	1,693,547.25	39.80884386	-80.81080899	
7,100.00	72.68	143.90	6,345.40	1,638.86	386.63	14,457,110.15	1,693,604.29	39.80864315	-80.81060643	
7,200.00	82.06	147.47	6,367.25	1,558.34	441.52	14,457,029.62	1,693,659.18	39.80842169	-80.81041159	
7,273.85	89.00	150.00	6,373.00	1,495.44	479.70	14,456,966.73	1,693,697.35	39.80824874	-80.81027613	
Begin 89.00° lateral										
7,300.00	89.00	150.00	6,373.46	1,472.80	492.77	14,456,944.09	1,693,710.43	39.80818648	-80.81022975	
7,400.00	89.00	150.00	6,375.21	1,386.21	542.76	14,456,857.50	1,693,760.42	39.80794839	-80.81005239	
7,500.00	89.00	150.00	6,376.95	1,299.62	592.75	14,456,770.91	1,693,810.41	39.80771030	-80.80987503	
7,600.00	89.00	150.00	6,378.70	1,213.03	642.75	14,456,684.32	1,693,860.40	39.80747221	-80.80969767	
7,700.00	89.00	150.00	6,380.44	1,126.44	692.74	14,456,597.73	1,693,910.40	39.80723412	-80.80952032	
7,800.00	89.00	150.00	6,382.19	1,039.85	742.73	14,456,511.14	1,693,960.39	39.80699603	-80.80934296	
7,900.00	89.00	150.00	6,383.93	953.27	792.72	14,456,424.55	1,694,010.38	39.80675794	-80.80916561	
8,000.00	89.00	150.00	6,385.68	866.68	842.72	14,456,337.96	1,694,060.37	39.80651985	-80.80898826	
8,100.00	89.00	150.00	6,387.42	780.09	892.71	14,456,251.37	1,694,110.36	39.80628176	-80.80881091	
8,200.00	89.00	150.00	6,389.17	693.50	942.70	14,456,164.78	1,694,160.36	39.80604367	-80.80863356	
8,300.00	89.00	150.00	6,390.91	606.91	992.69	14,456,078.19	1,694,210.35	39.80580558	-80.80845621	
8,400.00	89.00	150.00	6,392.66	520.32	1,042.69	14,455,991.61	1,694,260.34	39.80556749	-80.80827887	
8,500.00	89.00	150.00	6,394.40	433.73	1,092.68	14,455,905.02	1,694,310.33	39.80532940	-80.80810152	
8,600.00	89.00	150.00	6,396.15	347.14	1,142.67	14,455,818.43	1,694,360.33	39.80509131	-80.80792418	
8,700.00	89.00	150.00	6,397.89	260.55	1,192.66	14,455,731.84	1,694,410.32	39.80485321	-80.80774683	
8,800.00	89.00	150.00	6,399.64	173.96	1,242.66	14,455,645.25	1,694,460.31	39.80461512	-80.80756949	
8,900.00	89.00	150.00	6,401.38	87.37	1,292.65	14,455,558.66	1,694,510.30	39.80437703	-80.80739215	
9,000.00	89.00	150.00	6,403.13	0.78	1,342.64	14,455,472.07	1,694,560.29	39.80413894	-80.80721481	
9,100.00	89.00	150.00	6,404.88	-85.81	1,392.63	14,455,385.48	1,694,610.29	39.80390084	-80.80703747	
9,200.00	89.00	150.00	6,406.62	-172.40	1,442.62	14,455,298.89	1,694,660.28	39.80366275	-80.80686014	
9,300.00	89.00	150.00	6,408.37	-258.99	1,492.62	14,455,212.30	1,694,710.27	39.80342466	-80.80668280	
9,400.00	89.00	150.00	6,410.11	-345.53	1,542.61	14,455,125.71	1,694,760.26	39.80318656	-80.80650547	



Planning Report - Geographic

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Office of Oil and Gas

JUL 16 2018

WV Department of
Environmental Protection

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 05HM (E)
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 05HM (E)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,500.00	89.00	150.00	6,411.66	-432.16	1,592.60	14,455,039.12	1,694,810.26	39.80294847	-80.80632813	
9,600.00	89.00	150.00	6,413.60	-518.75	1,642.59	14,454,952.53	1,694,860.25	39.80271037	-80.80815080	
9,700.00	89.00	150.00	6,415.35	-605.34	1,692.59	14,454,865.95	1,694,910.24	39.80247228	-80.80597347	
9,800.00	89.00	150.00	6,417.09	-691.93	1,742.58	14,454,779.36	1,694,960.23	39.80223418	-80.80579614	
9,900.00	89.00	150.00	6,418.84	-778.52	1,792.57	14,454,692.77	1,695,010.23	39.80199609	-80.80561881	
10,000.00	89.00	150.00	6,420.58	-865.11	1,842.56	14,454,606.18	1,695,060.22	39.80175799	-80.80544148	
10,100.00	89.00	150.00	6,422.33	-951.70	1,892.56	14,454,519.59	1,695,110.21	39.80151990	-80.80526416	
10,200.00	89.00	150.00	6,424.07	-1,038.29	1,942.55	14,454,433.00	1,695,160.20	39.80128180	-80.80508683	
10,300.00	89.00	150.00	6,425.82	-1,124.88	1,992.54	14,454,346.41	1,695,210.19	39.80104370	-80.80490951	
10,400.00	89.00	150.00	6,427.56	-1,211.47	2,042.53	14,454,259.82	1,695,260.19	39.80080561	-80.80473219	
10,500.00	89.00	150.00	6,429.31	-1,298.06	2,092.53	14,454,173.23	1,695,310.18	39.80056751	-80.80455487	
10,600.00	89.00	150.00	6,431.05	-1,384.65	2,142.52	14,454,086.64	1,695,360.17	39.80032941	-80.80437755	
10,700.00	89.00	150.00	6,432.80	-1,471.24	2,192.51	14,454,000.05	1,695,410.16	39.80009131	-80.80420023	
10,800.00	89.00	150.00	6,434.54	-1,557.83	2,242.50	14,453,913.46	1,695,460.16	39.79985322	-80.80402291	
10,900.00	89.00	150.00	6,436.29	-1,644.42	2,292.50	14,453,826.88	1,695,510.15	39.79961512	-80.80384559	
11,000.00	89.00	150.00	6,438.03	-1,731.00	2,342.49	14,453,740.29	1,695,560.14	39.79937702	-80.80366828	
11,100.00	89.00	150.00	6,439.78	-1,817.59	2,392.48	14,453,653.70	1,695,610.13	39.79913892	-80.80349097	
11,200.00	89.00	150.00	6,441.53	-1,904.18	2,442.47	14,453,567.11	1,695,660.13	39.79890082	-80.80331365	
11,300.00	89.00	150.00	6,443.27	-1,990.77	2,492.47	14,453,480.52	1,695,710.12	39.79866272	-80.80313634	
11,400.00	89.00	150.00	6,445.02	-2,077.36	2,542.46	14,453,393.93	1,695,760.11	39.79842462	-80.80295903	
11,500.00	89.00	150.00	6,446.76	-2,163.95	2,592.45	14,453,307.34	1,695,810.10	39.79818652	-80.80278172	
11,600.00	89.00	150.00	6,448.51	-2,250.54	2,642.44	14,453,220.75	1,695,860.09	39.79794842	-80.80260442	
11,700.00	89.00	150.00	6,450.25	-2,337.13	2,692.43	14,453,134.16	1,695,910.09	39.79771032	-80.80242711	
11,800.00	89.00	150.00	6,452.00	-2,423.72	2,742.43	14,453,047.57	1,695,960.08	39.79747222	-80.80224980	
11,900.00	89.00	150.00	6,453.74	-2,510.31	2,792.42	14,452,960.98	1,696,010.07	39.79723412	-80.80207250	
12,000.00	89.00	150.00	6,455.49	-2,596.90	2,842.41	14,452,874.39	1,696,060.06	39.79699602	-80.80189520	
12,100.00	89.00	150.00	6,457.23	-2,683.49	2,892.40	14,452,787.81	1,696,110.06	39.79675792	-80.80171790	
12,200.00	89.00	150.00	6,458.98	-2,770.08	2,942.40	14,452,701.22	1,696,160.05	39.79651982	-80.80154060	
12,300.00	89.00	150.00	6,460.72	-2,856.67	2,992.39	14,452,614.63	1,696,210.04	39.79628171	-80.80136330	
12,400.00	89.00	150.00	6,462.47	-2,943.26	3,042.38	14,452,528.04	1,696,260.03	39.79604361	-80.80118600	
12,500.00	89.00	150.00	6,464.21	-3,029.85	3,092.37	14,452,441.45	1,696,310.02	39.79580551	-80.80100870	
12,600.00	89.00	150.00	6,465.96	-3,116.43	3,142.37	14,452,354.86	1,696,360.02	39.79556741	-80.80083141	
12,700.00	89.00	150.00	6,467.70	-3,203.02	3,192.36	14,452,268.27	1,696,410.01	39.79532930	-80.80065411	
12,800.00	89.00	150.00	6,469.45	-3,289.61	3,242.35	14,452,181.68	1,696,460.00	39.79509120	-80.80047682	
12,900.00	89.00	150.00	6,471.19	-3,376.20	3,292.34	14,452,095.09	1,696,509.99	39.79485310	-80.80029953	
13,000.00	89.00	150.00	6,472.94	-3,462.79	3,342.34	14,452,008.50	1,696,559.99	39.79461499	-80.80012224	
13,100.00	89.00	150.00	6,474.68	-3,549.38	3,392.33	14,451,921.91	1,696,609.98	39.79437689	-80.79994495	
13,200.00	89.00	150.00	6,476.43	-3,635.97	3,442.32	14,451,835.32	1,696,659.97	39.79413878	-80.79976766	
13,300.00	89.00	150.00	6,478.18	-3,722.56	3,492.31	14,451,748.74	1,696,709.96	39.79390068	-80.79959037	
13,400.00	89.00	150.00	6,479.92	-3,809.15	3,542.31	14,451,662.15	1,696,759.95	39.79366257	-80.79941309	
13,500.00	89.00	150.00	6,481.67	-3,895.74	3,592.30	14,451,575.56	1,696,809.95	39.79342447	-80.79923580	
13,600.00	89.00	150.00	6,483.41	-3,982.33	3,642.29	14,451,488.97	1,696,859.94	39.79318636	-80.79905852	
13,700.00	89.00	150.00	6,485.16	-4,068.92	3,692.28	14,451,402.38	1,696,909.93	39.79294826	-80.79888124	
13,800.00	89.00	150.00	6,486.90	-4,155.51	3,742.27	14,451,315.79	1,696,959.92	39.79271015	-80.79870396	
13,900.00	89.00	150.00	6,488.65	-4,242.10	3,792.27	14,451,229.20	1,697,009.92	39.79247204	-80.79852668	
14,000.00	89.00	150.00	6,490.39	-4,328.69	3,842.26	14,451,142.61	1,697,059.91	39.79223394	-80.79834940	
14,100.00	89.00	150.00	6,492.14	-4,415.27	3,892.25	14,451,056.02	1,697,109.90	39.79199583	-80.79817212	
14,200.00	89.00	150.00	6,493.88	-4,501.86	3,942.24	14,450,969.43	1,697,159.89	39.79175772	-80.79799485	
14,300.00	89.00	150.00	6,495.63	-4,588.45	3,992.24	14,450,882.84	1,697,209.89	39.79151961	-80.79781757	
14,400.00	89.00	150.00	6,497.37	-4,675.04	4,042.23	14,450,796.25	1,697,259.88	39.79128151	-80.79764030	
14,500.00	89.00	150.00	6,499.12	-4,761.63	4,092.22	14,450,709.67	1,697,309.87	39.79104340	-80.79746303	
14,600.00	89.00	150.00	6,500.86	-4,848.22	4,142.21	14,450,623.08	1,697,359.86	39.79080529	-80.79728575	
14,700.00	89.00	150.00	6,502.61	-4,934.81	4,192.21	14,450,536.49	1,697,409.86	39.79056718	-80.79710848	
14,800.00	89.00	150.00	6,504.35	-5,021.40	4,242.20	14,450,449.90	1,697,459.85	39.79032907	-80.79693122	
14,900.00	89.00	150.00	6,506.10	-5,107.99	4,292.19	14,450,363.31	1,697,509.84	39.79009096	-80.79675395	



Planning Report - Geographic

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WV Department of
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Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 05HM (E)
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 05HM (E)	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	
15,000.00	89.00	150.00	6,507.84	-5,194.58	4,342.18	14,450,276.72	1,697,559.83	39.78985285	-80.79657668	
15,100.00	89.00	150.00	6,509.59	-5,281.17	4,392.18	14,450,190.13	1,697,609.82	39.78961474	-80.79639942	
15,200.00	89.00	150.00	6,511.34	-5,367.76	4,442.17	14,450,103.54	1,697,659.82	39.78937663	-80.79622215	
15,300.00	89.00	150.00	6,513.08	-5,454.35	4,492.16	14,450,016.95	1,697,709.81	39.78913852	-80.79604489	
15,400.00	89.00	150.00	6,514.83	-5,540.94	4,542.15	14,449,930.36	1,697,759.80	39.78890041	-80.79586763	
15,500.00	89.00	150.00	6,516.57	-5,627.53	4,592.15	14,449,843.77	1,697,809.79	39.78866230	-80.79569037	
15,600.00	89.00	150.00	6,518.32	-5,714.12	4,642.14	14,449,757.18	1,697,859.79	39.78842419	-80.79551311	
15,700.00	89.00	150.00	6,520.06	-5,800.70	4,692.13	14,449,670.59	1,697,909.78	39.78818608	-80.79533585	
15,800.00	89.00	150.00	6,521.81	-5,887.29	4,742.12	14,449,584.01	1,697,959.77	39.78794797	-80.79515860	
15,900.00	89.00	150.00	6,523.55	-5,973.88	4,792.11	14,449,497.42	1,698,009.76	39.78770985	-80.79498134	
16,000.00	89.00	150.00	6,525.30	-6,060.47	4,842.11	14,449,410.83	1,698,059.75	39.78747174	-80.79480409	
16,100.00	89.00	150.00	6,527.04	-6,147.06	4,892.10	14,449,324.24	1,698,109.75	39.78723363	-80.79462684	
16,200.00	89.00	150.00	6,528.79	-6,233.65	4,942.09	14,449,237.65	1,698,159.74	39.78699552	-80.79444958	
16,300.00	89.00	150.00	6,530.53	-6,320.24	4,992.08	14,449,151.06	1,698,209.73	39.78675740	-80.79427233	
16,400.00	89.00	150.00	6,532.28	-6,406.83	5,042.08	14,449,064.47	1,698,259.72	39.78651929	-80.79409508	
16,500.00	89.00	150.00	6,534.02	-6,493.42	5,092.07	14,448,977.88	1,698,309.72	39.78628118	-80.79391784	
16,600.00	89.00	150.00	6,535.77	-6,580.01	5,142.06	14,448,891.29	1,698,359.71	39.78604306	-80.79374059	
16,700.00	89.00	150.00	6,537.51	-6,666.60	5,192.05	14,448,804.70	1,698,409.70	39.78580495	-80.79356334	
16,800.00	89.00	150.00	6,539.26	-6,753.19	5,242.05	14,448,718.11	1,698,459.69	39.78556683	-80.79338610	
16,900.00	89.00	150.00	6,541.00	-6,839.78	5,292.04	14,448,631.52	1,698,509.69	39.78532872	-80.79320886	
17,000.00	89.00	150.00	6,542.75	-6,926.37	5,342.03	14,448,544.94	1,698,559.68	39.78509060	-80.79303162	
17,100.00	89.00	150.00	6,544.49	-7,012.96	5,392.02	14,448,458.35	1,698,609.67	39.78485249	-80.79285438	
17,200.00	89.00	150.00	6,546.24	-7,099.54	5,442.02	14,448,371.76	1,698,659.66	39.78461437	-80.79267714	
17,300.00	89.00	150.00	6,547.99	-7,186.13	5,492.01	14,448,285.17	1,698,709.65	39.78437625	-80.79249990	
17,400.00	89.00	150.00	6,549.73	-7,272.72	5,542.00	14,448,198.58	1,698,759.65	39.78413814	-80.79232266	
17,500.00	89.00	150.00	6,551.48	-7,359.31	5,591.99	14,448,111.99	1,698,809.64	39.78390002	-80.79214543	
17,600.00	89.00	150.00	6,553.22	-7,445.90	5,641.99	14,448,025.40	1,698,859.63	39.78366191	-80.79196819	
17,700.00	89.00	150.00	6,554.97	-7,532.49	5,691.98	14,447,938.81	1,698,909.62	39.78342379	-80.79179096	
17,800.00	89.00	150.00	6,556.71	-7,619.08	5,741.97	14,447,852.22	1,698,959.62	39.78318567	-80.79161373	
17,873.85	89.00	150.00	6,558.00	-7,683.03	5,778.89	14,447,788.28	1,698,996.54	39.78300982	-80.79148284	

PBHL/TD 17873.85 MD/6558.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Woodford 05HM LP - hit/miss target - Shape	0.00	0.00	6,362.00	2,027.73	172.38	14,457,499.01	1,693,390.04	39.80971232	-80.81136643	
- plan misses target center by 267.24ft at 6800.00ft MD (6191.64 TVD, 1826.51 N, 216.01 E)										
- Point										
Woodford 05HM BHL r1 - plan hits target center - Point	0.00	0.00	6,558.00	-7,683.03	5,778.89	14,447,788.28	1,698,996.54	39.78300982	-80.79148284	



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Woodford 05HM (E)
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 05HM (E)	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)	
1,300.00	1,300.00	0.00	0.00	KOP Begin 2°/100' build
1,550.00	1,549.68	7.71	-7.71	Begin 2°/100' build/turn
1,744.23	1,743.25	22.16	-13.58	Begin 5.00° tangent
3,106.16	3,100.00	140.85	-11.99	Begin 6°/100' build
3,626.08	3,580.69	321.50	-11.91	Begin 36.19° tangent
6,075.38	5,557.33	1,767.87	-14.03	Begin 10°/100' drop/build/turn
7,273.85	6,373.00	1,495.44	479.70	Begin 89.00° lateral
17,873.85	6,558.00	-7,683.03	5,778.89	PBHL/TD 17873.85 MD/6558.00 TVD

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

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FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

WV Department of
Environmental Protection

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 / WV0108185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1389426)

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

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

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

Company Official Signature *Jim Pancake*

Company Official (Typed Name) Jim Pancake

Company Official Title Vice President - Geoscience

Subscribed and sworn before me this 6th day of July, 20 18

[Signature]

Notary Public
COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Matthew W. Reese, Notary Public
Cranberry Twp., Butler County
My Commission Expires June 30, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

My commission expires 6-30-2019

Tug Hill Operating, LLC

4705 + 02075

Proposed Revegetation Treatment: Acres Disturbed 44.60 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: *John DeLoach*

Comments: _____

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Environmental Protection

Title: Oil & Gas Inspector

Date: 7/5/18

Field Reviewed? () Yes () No

WW-9

PROPOSED WOODFORD 5HM
 SHEET 2

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.

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

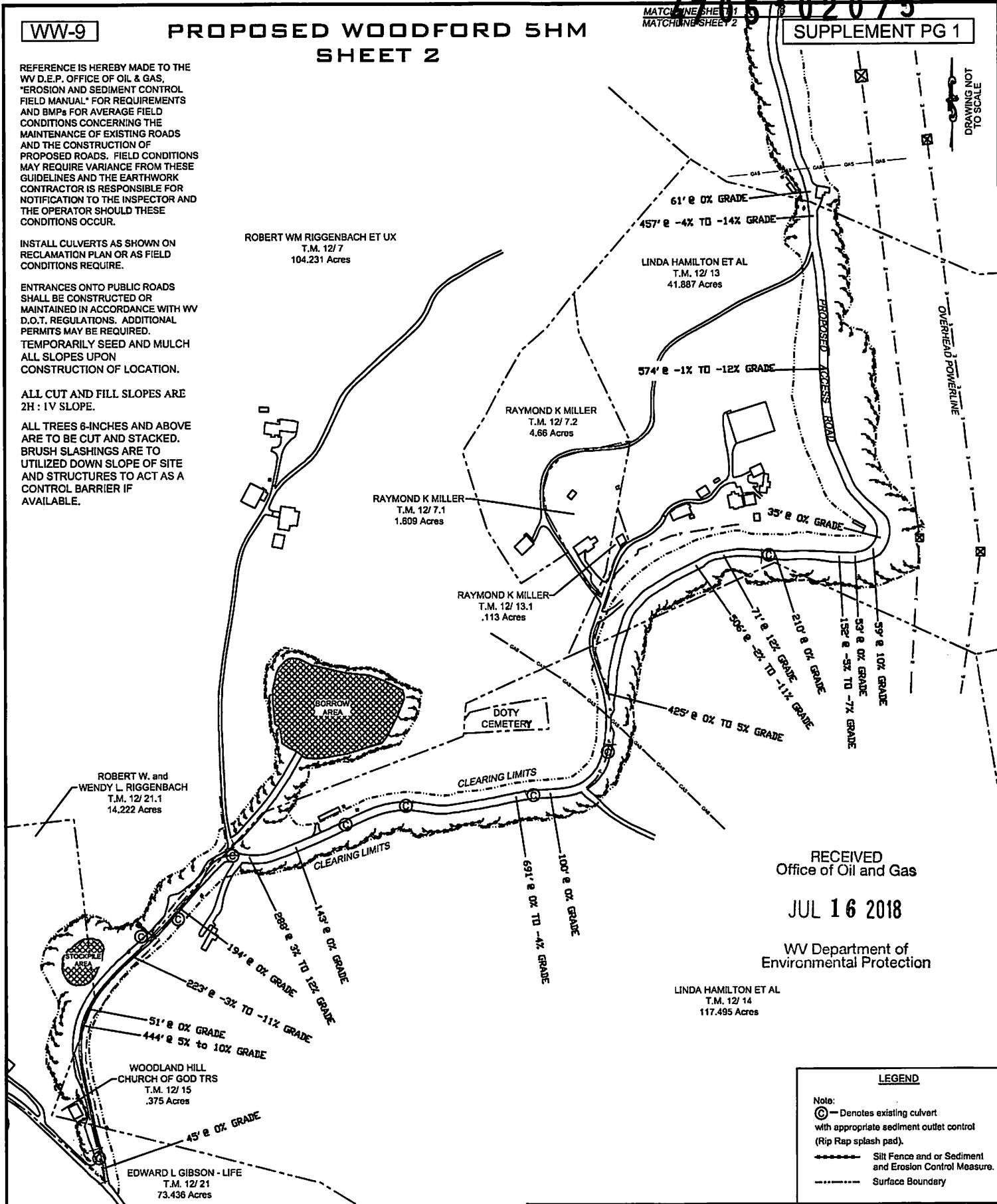
RAYMOND K MILLER
 T.M. 12/ 13.1
 .113 Acres

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



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WV Department of Environmental Protection

LEGEND

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

WW-9

PROPOSED WOODFORD 5HM
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.

CLEARING LIMITS

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

31' @ -8% GRADE
41' @ 0% GRADE
649' @ 6% to 14% GRADE

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

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

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

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

RECEIVED
Office of Oil and Gas

JUL 16 2018

WV Department of
Environmental Protection

22' @ 4% GRADE
28' @ -1% GRADE
61' @ 1% GRADE
91' @ -1% GRADE
161' @ 0% GRADE

755' @ 3% TO 16% GRADE

MATCHLINE SHEET 1
MATCHLINE SHEET 2

DRAWING NOT
TO SCALE

OVERHEAD POWERLINE

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

DATE: 07-04-2018

PROJECT NO: 494510851

DRAWN BY: J.A.H.

4705 + 02075



Well Site Safety Plan

Tug Hill Operating, LLC

John
7/5/18

Well Name: Woodford 5HM

Pad Location: Woodford Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,406,036.46

Easting: 516,093.78

July 2018

RECEIVED
Office of Oil and Gas

JUL 16 2018

WV Department of
Environmental Protection

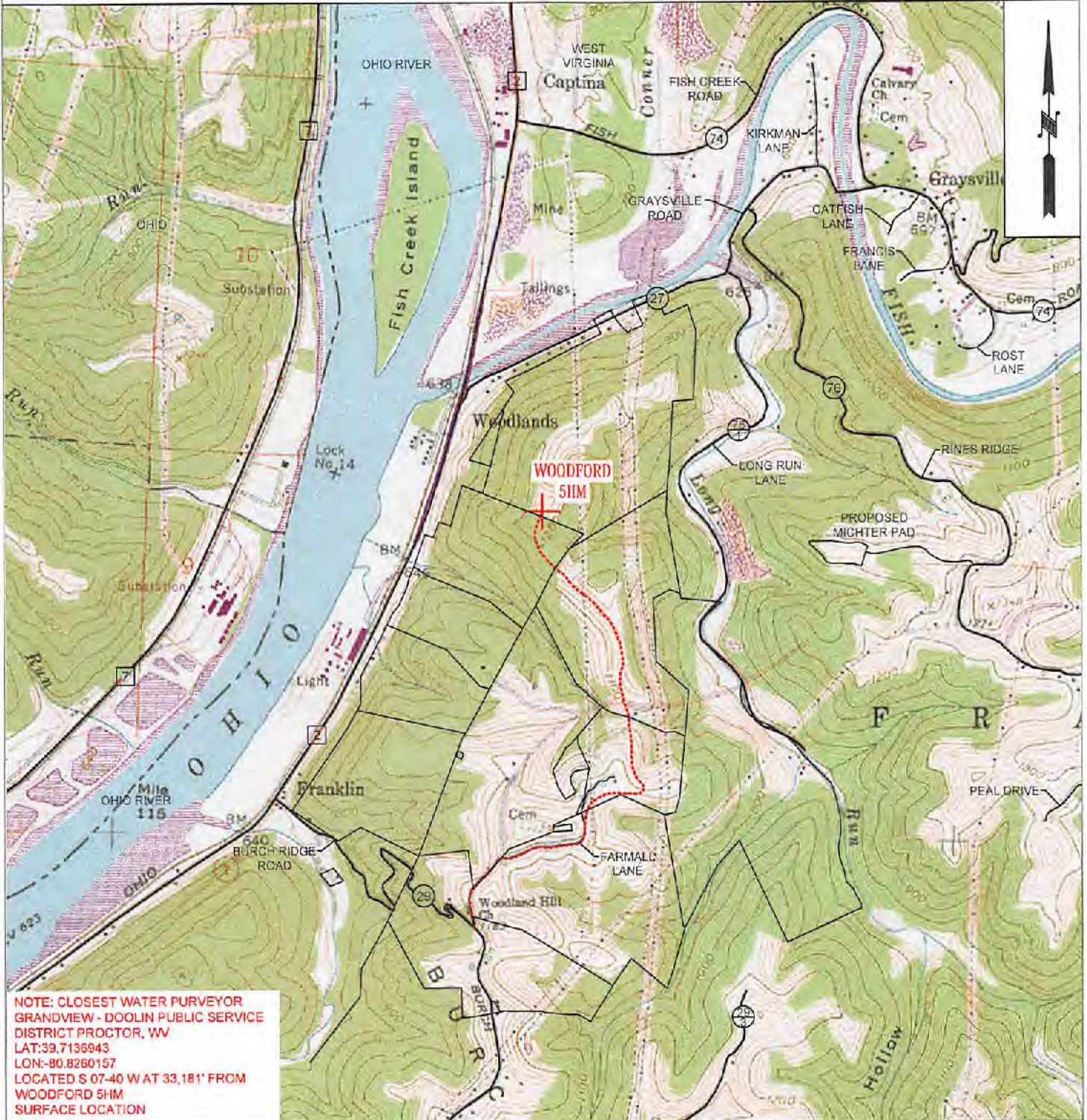
JUL 16 2018

4705-020752
SUPPLEMENT PG 52

WW-9

WV Department of
Environmental Protection

PROPOSED WOODFORD 5HM



NOTE: CLOSEST WATER PURVEYOR
GRANDVIEW - DOOLIN PUBLIC SERVICE
DISTRICT PROCTOR, WV
LAT:39.7136943
LON:-80.8260157
LOCATED S 07-40 W AT 33,181' FROM
WOODFORD 5HM
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:		DATE:	
1" = 2000'		DATE: 07-04-2018	

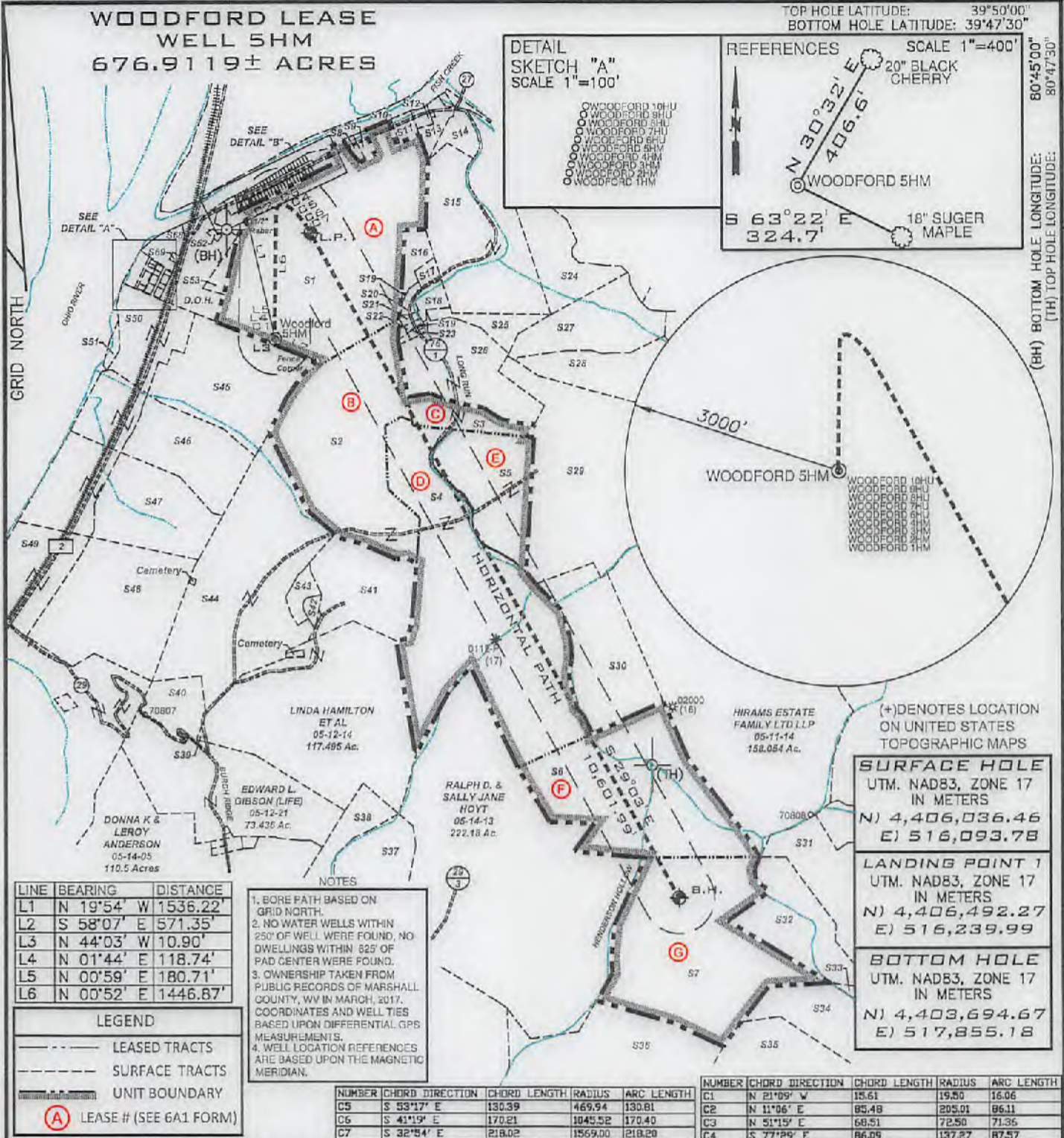
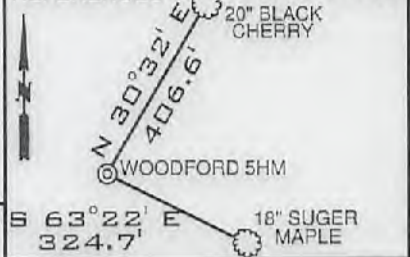
WOODFORD LEASE WELL 5HM 676.9119± ACRES

DETAIL
SKETCH "A"
SCALE 1"=100'

REFERENCES

SCALE 1"=400'

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



LINE	BEARING	DISTANCE
L1	N 19°54' W	1536.22'
L2	S 58°07' E	571.35'
L3	N 44°03' W	10.90'
L4	N 01°44' E	118.74'
L5	N 00°59' E	180.71'
L6	N 00°52' E	1446.87'

LEGEND

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

- NOTES**
- BORE PATH BASED ON GRID NORTH.
 - NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 525' 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.

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C5	S 53°17' E	130.39	469.94	130.81
C6	S 41°19' E	170.21	1045.52	170.40
C7	S 32°54' E	218.02	1569.00	218.20

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 21°09' W	15.61	19.50	16.06
C2	N 11°06' E	85.48	205.01	86.11
C3	N 51°15' E	68.51	72.50	71.36
C4	S 77°29' E	86.09	137.27	87.57

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,406,036.46
E) 516,093.78

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,406,492.27
E) 516,239.99

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,403,694.67
E) 517,855.18

FILE NUMBER _____

DRAWING NUMBER WOODFORD_WP_5HM

SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

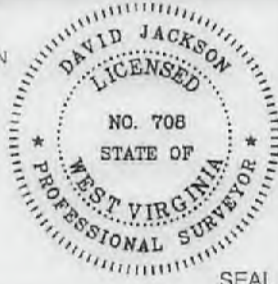
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

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



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 ___ SHALLOW X

DATE: JULY 03, 2018

OPERATORS WELL NO. Woodford 5HM

API WELL NO. 47-051-02075 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 ROPC, 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) _____

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,490' TMD: 17,874'

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

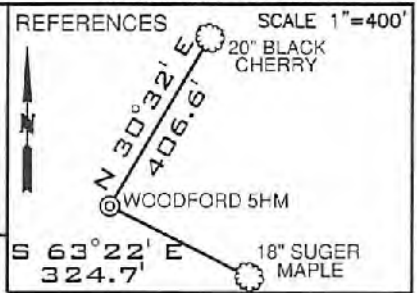
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD
FORT WORTH, TX 76107 CHARLESTON, WV 25313

COUNTY NAME
PERMIT

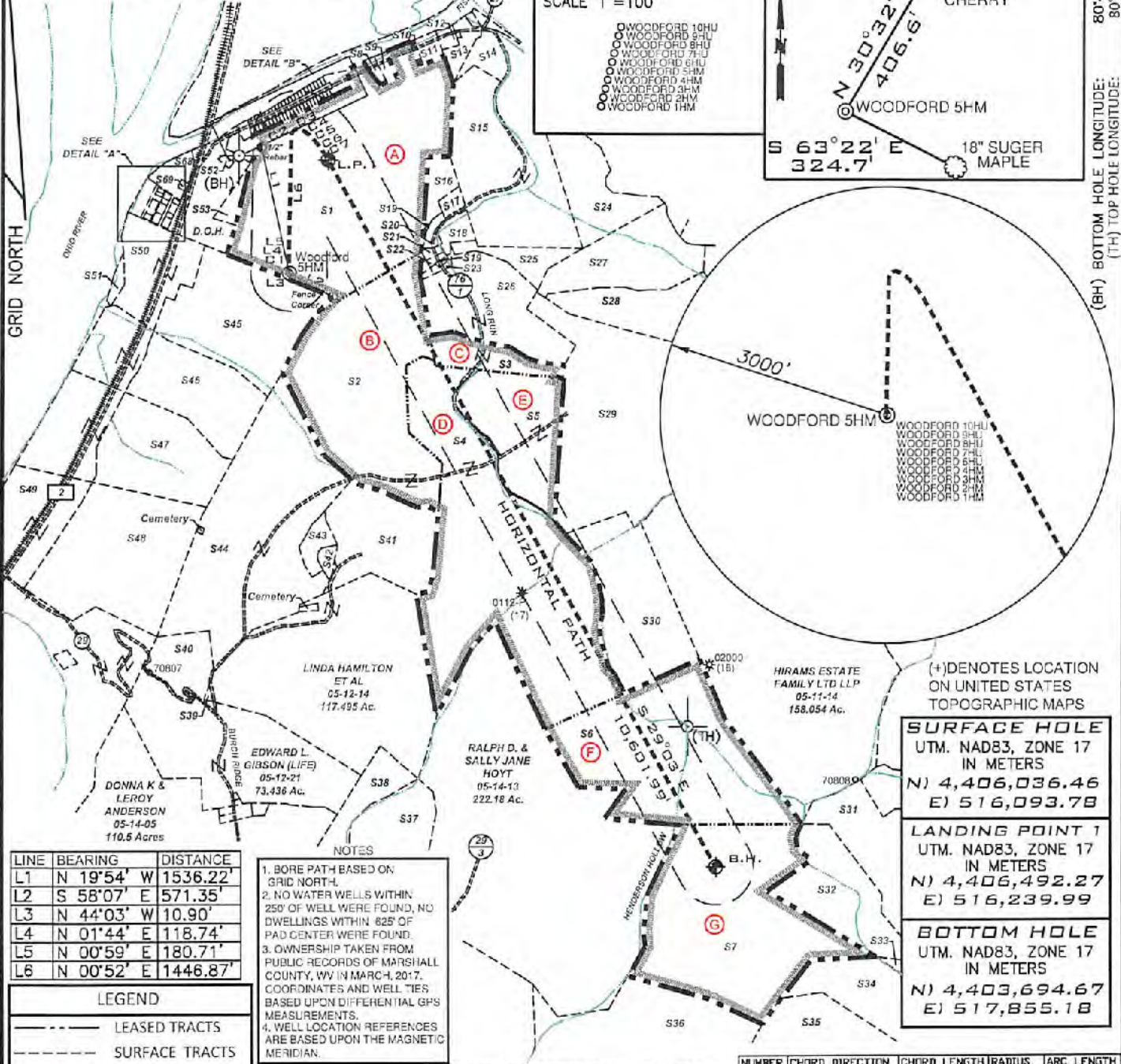
WOODFORD LEASE WELL 5HM 676.9119± ACRES

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

DETAIL SKETCH "A"
SCALE 1"=100'



- WOODFORD 10HU
- WOODFORD 9HU
- WOODFORD 8HU
- WOODFORD 7HU
- WOODFORD 6HU
- WOODFORD 5HM
- WOODFORD 4HM
- WOODFORD 3HM
- WOODFORD 2HM
- WOODFORD 1HM



LINE	BEARING	DISTANCE
L1	N 19°54' W	1536.22'
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L3	N 44°03' W	10.90'
L4	N 01°44' E	118.74'
L5	N 00°59' E	180.71'
L6	N 00°52' E	1446.87'

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LEGEND

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

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
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C3	N 51°15' E	68.51	72.50	71.36
C4	S 77°29' E	86.09	137.27	87.57

FILE NUMBER _____

DRAWING NUMBER WOODFORD_WP_5HM

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



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

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

DATE: JULY 03, 2018

OPERATORS WELL NO. Woodford 5HM

API WELL NO. 47-051-

STATE COUNTY PERMIT

LOCATION ELEVATION 1233.51' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER

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PROPOSED WORK: DRILL X CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION

PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY)

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,490' TMD: 17,874'

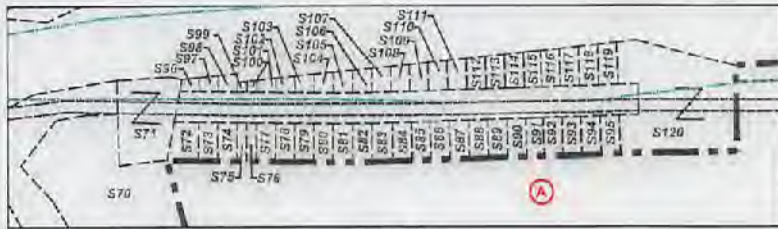
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER

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

COUNTY NAME PERMIT

Form WVF

**WOODFORD LEASE
WELL 5HM
676.9119± ACRES**



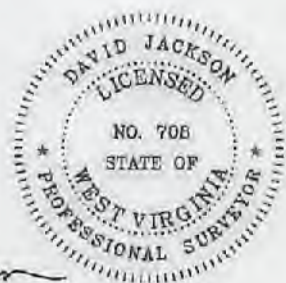
DETAIL "A"
Scale
1"=500'



DETAIL "B"
Scale
1"=500'

Number	TAX MAP-PARCEL	ADJOINER OWNER	ACRES
S1	05-07-43	CNX RCPC, LLC	155.7119
S2	05-12-08	Amita Rae Miller (Life)	100.35
S3	05-12-10	Consolidation Coal Co./ Murray Energy	13.76
S4	05-12-12.1	Lionel L. Persinger, Et Ux.	148.09
S5	05-12-12	Lionel L. Persinger, Et Ux.	45.0
S6	05-11-15	Lionel L. Persinger, Et Ux.	93.0
S7	05-15-01	Marcus Sharp & David Schlabach, Hrs.	121.0
S8	05-7B-49	Cassidy Rain Carpenter	1.1441
S9	05-7B-48	Cassidy Rain Carpenter	1.325
S10	05-07-43.3	Frank M. Mason	0.327
S11	05-07-43.2	Frank M. 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	57.0
S16	05-07-42.1	Holly Rice	5.99
S17	05-07-41	James A. Wade	1.0
S18	05-07-42.5	Matthew V. Conner, et al	3.791
S19	05-07-42	Tracy M. Kesterson	0.53
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	Jason Reed Hartley	0.94
S24	05-07-33	William N. Roupe	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 R. 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	5.0
S34	05-15-14	John David Petrock, et ux	25.0
S35	05-15-12	John David Petrock, et ux	150.23
S36	05-15-15	Robert L. Shields, et al	49.0
S37	05-14-12	Dale R. Gallaher, et al	135.100
S38	05-14-10	Adam T. & Jesse L. Robinson	110.715
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	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	05-12-02	CNX RCPC, LLC	60.68
S46	05-12-03	CNX RCPC, LLC	62.30
S47	05-12-05	CNX RCPC, LLC	61.883
S48	05-12-06	CNX RCPC, LLC	70.81
S49	05-12-6.2	Consolidation Coal Co./ Murray Energy	25.50

Number	TAX MAP-PARCEL	ADJOINER OWNER	ACRES
S50	05-12-2.1	Consolidation Coal Co./ Murray Energy	22.0
S51	05-12-01	U.S. of America	1.68
S52	05-07-43.4	Chalmer Campbell	0.295
S53	05-07-43.1	State Road Commission	1.48
S54	05-7A-17	Carol Martin & Harry L. Yoho	0.3067
S55	05-7A-18	Shelia R. Rutan	0.1530
S56	05-7A-19	Shelia R. Rutan	0.3060
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. Baysar	0.1868
S62	05-7A-25	Rick A. Kosky	0.1638
S63	05-7A-26	Albert Joseph White, Est	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	05-7A-31	WVA Dept. of Natural Resources	3.18
S69	05-7A-32	Dawn Thompson Tennant	0.3091
S70	05-7A-02	CNX RCPC, LLC	2.23
S71	05-7A-01	Lucille Myers	0.529
S72	05-7B-25	Cindy D. Aliff	0.1673
S73	05-7B-28	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-24	Cindy D. Aliff	0.0354
S97	05-7B-23	Cindy D. Aliff	0.0471
S98	05-7B-22	Patricia A. Johnson	0.0505
S99	05-7B-21	Patricia A. Johnson	0.0287
S100	05-7B-21.1	Patricia A. Johnson	0.0286
S101	05-7B-20	Patricia A. Johnson	0.0626
S102	05-7B-19	Cindy D. Aliff, et al	0.0712
S103	05-7B-18	Cindy D. Aliff, et al	0.0783
S104	05-7B-17	Albert J. Anderson, Jr.	0.0849
S105	05-7B-16	Albert J. Anderson, Jr.	0.0903
S106	05-7B-15	Albert J. Anderson, Jr.	0.0970
S107	05-7B-14	Albert J. Anderson, Jr.	0.0991
S108	05-7B-13	Albert J. Anderson, Jr.	0.1067
S109	05-7B-12	Teresa & Thomas Gouldsberry	0.1113
S110	05-7B-11	Teresa & Thomas Gouldsberry	0.1159
S111	05-7B-10	Teresa & Thomas Gouldsberry	0.1199
S112	05-7B-09	Teresa & Thomas Gouldsberry	0.1240
S113	05-7B-08	Teresa & Thomas Gouldsberry	0.1286
S114	05-7B-07	Teresa & Thomas Gouldsberry	0.1331
S115	05-7B-06	Teresa & Thomas Gouldsberry	0.1377
S116	05-7B-05	Daniel D. & Mary E. Robinson	0.1418
S117	05-7B-04	Daniel D. & Mary E. Robinson	0.1458
S118	05-7B-03	Daniel D. Robinson, et ux	0.1504
S119	05-7B-02	Daniel D. Robinson, et ux	0.1550
S120	05-7B-01	Patricia L. Robinson	1.257



P.S. 708 *David L Jackson*



TUG HILL
OPERATING

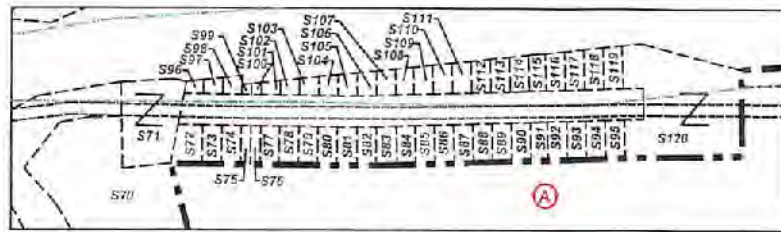
OPERATOR'S
WELL #: WOODFORD 5HM
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE 2 OF 2
DATE: 07/03/2018

Tom: wwg

**WOODFORD LEASE
WELL 5HM
676.9119± ACRES**

4705102075



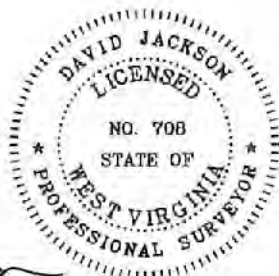
DETAIL "A"
Scale
1"=500'



DETAIL "B"
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S5	05-12-12	Lionel L. Persinger, Et Ux.	45.0
S6	05-11-15	Lionel L. Persinger, Et Ux.	93.0
S7	05-15-01	Marcus Sharp & David Schlabach, Hrs.	121.0
S8	05-7B-49	Cassidy Rain Carpenter	1.1441
S9	05-7B-48	Cassidy Rain Carpenter	1.325
S10	05-07-43.3	Frank M. Mason	0.327
S11	05-07-43.2	Frank M. Mason	1.36
S12	05-07-38	John K. Persinger, Et Ux.	2.65
S13	05-07-36	John Persinger	4.329
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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 R. 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	5.0
S34	05-15-14	John David Petrock, et ux	25.0
S35	05-15-12	John David Petrock, et ux	150.23
S36	05-15-15	Robert L. Shields, et al	49.0
S37	05-14-12	Dale R. Galloher, et al	135.100
S38	05-14-10	Adam T. & Jesse L. Robinson	110.715
S39	05-12-15	Woodland Hills Church of God Trs.	0.375
S40	05-12-21.1	Robert W. Jr. & Wendy L. Rigenbach	14.222
S41	05-12-13	Linda Hamilton, et al	41.887
S42	05-12-7.1	Raymond K. Miller	1.809
S43	05-12-7.2	Raymond K. Miller	4.86
S44	05-12-07	Robert Wm. Rigenbach, et ux	104.231
S45	05-12-02	CNX RCPC, LLC	60.68
S46	05-12-03	CNX RCPC, LLC	62.30
S47	05-12-05	CNX RCPC, LLC	61.883
S48	05-12-06	CNX RCPC, LLC	70.81
S49	05-12-6.2	Consolidation Coal Co./ Murray Energy	25.50

Number	TAX MAP-PARCEL	ADJOINER OWNER	ACRES
S50	05-12-2.1	Consolidation Coal Co./ Murray Energy	22.0
S51	05-12-01	U.S. of America	1.68
S52	05-07-43.4	Chalmer Campbell	0.295
S53	05-07-43.1	State Road Commission	1.48
S54	05-7A-17	Carol Martin & Harry L. Yoho	0.3067
S55	05-7A-18	Shelia R. Rutan	0.1530
S56	05-7A-19	Shelia R. Rutan	0.3060
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	Albert Joseph White, Est	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	05-7A-31	WVA Dept. of Natural Resources	3.18
S69	05-7A-32	Dawn Thompson Tennant	0.3091
S70	05-7A-02	CNX RCPC, LLC	2.23
S71	05-7A-01	Lucille Myers	0.529
S72	05-7B-25	Cindy D. Aliff	0.1673
S73	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-24	Cindy D. Aliff	0.0354
S97	05-7B-23	Cindy D. Aliff	0.0471
S98	05-7B-22	Patricia A. Johnson	0.0505
S99	05-7B-21	Patricia A. Johnson	0.0287
S100	05-7B-21.1	Patricia A. Johnson	0.0296
S101	05-7B-20	Patricia A. Johnson	0.0626
S102	05-7B-19	Cindy D. Aliff, et al	0.0712
S103	05-7B-18	Cindy D. Aliff, et al	0.0763
S104	05-7B-17	Albert J. Anderson, Jr.	0.0849
S105	05-7B-16	Albert J. Anderson, Jr.	0.0903
S106	05-7B-15	Albert J. Anderson, Jr.	0.0970
S107	05-7B-14	Albert J. Anderson, Jr.	0.0991
S108	05-7B-13	Albert J. Anderson, Jr.	0.1067
S109	05-7B-12	Teresa & Thomas Gouldsberry	0.1113
S110	05-7B-11	Teresa & Thomas Gouldsberry	0.1159
S111	05-7B-10	Teresa & Thomas Gouldsberry	0.1199
S112	05-7B-09	Teresa & Thomas Gouldsberry	0.1240
S113	05-7B-08	Teresa & Thomas Gouldsberry	0.1286
S114	05-7B-07	Teresa & Thomas Gouldsberry	0.1331
S115	05-7B-06	Teresa & Thomas Gouldsberry	0.1377
S116	05-7B-05	Daniel D. & Mary E. Robinson	0.1418
S117	05-7B-04	Daniel D. & Mary E. Robinson	0.1458
S118	05-7B-03	Daniel D. Robinson, et ux	0.1504
S119	05-7B-02	Daniel D. Robinson, et ux	0.1550
S120	05-7B-01	Patricia L. Robinson	1.257



P.S. 708 *David L Jackson*



**TUG HILL
OPERATING**

OPERATOR'S
WELL #1: WOODFORD 5HM
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

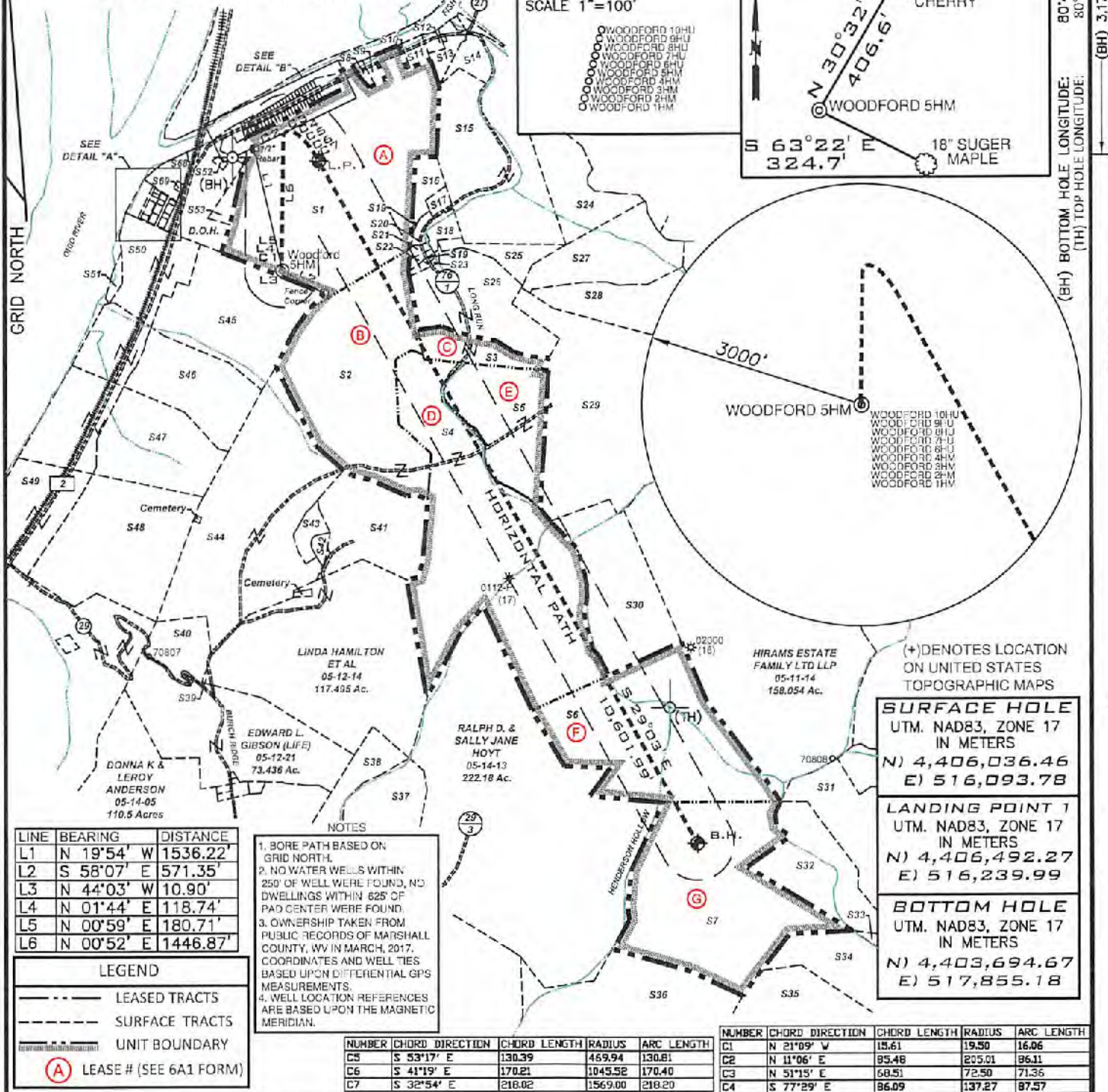
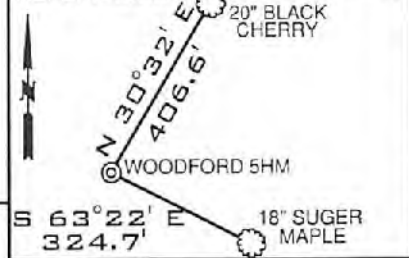
WELL PLAT
PAGE 2 OF 2
DATE: 07/03/2018

**WOODFORD LEASE
WELL 5HM
676.9119± ACRES**

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

DETAIL SKETCH "A" SCALE 1"=100'

REFERENCES SCALE 1"=400'



LINE	BEARING	DISTANCE
L1	N 19°54' W	1536.22'
L2	S 58°07' E	571.35'
L3	N 44°03' W	10.90'
L4	N 01°44' E	118.74'
L5	N 00°59' E	180.71'
L6	N 00°52' E	1446.87'

LEGEND

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

- NOTES**
- BORE PATH BASED ON GRID NORTH.
 - NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 625' 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.

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 21°09' W	15.61	19.50	16.06
C2	N 11°06' E	85.48	205.01	86.11
C3	N 51°15' E	68.51	72.50	71.36
C4	S 77°29' E	86.09	137.27	87.57

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

SURFACE HOLE	
UTM. NAD83, ZONE 17	IN METERS
N) 4,406,036.46	E) 516,093.78

LANDING POINT 1	
UTM. NAD83, ZONE 17	IN METERS
N) 4,406,492.27	E) 516,239.99

BOTTOM HOLE	
UTM. NAD83, ZONE 17	IN METERS
N) 4,403,694.67	E) 517,855.18

FILE NUMBER _____

DRAWING NUMBER WOODFORD_WP_5HM

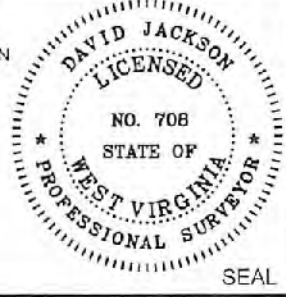
SCALE 1" = 2000'

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



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

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

DATE: JULY 03, 2018

OPERATORS WELL NO. Woodford 5HM

API WELL NO. 47-051-

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-8A1 Form

SURFACE OWNER CNX RCPC, LLC ACREAGE 155.7119

OIL & GAS ROYALTY OWNER HG ENERGY II APPALACHIA LC (TRACT 5-7-43) LEASE ACREAGE 155.7119

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION

PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY)

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,490' TMD: 17,874'

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

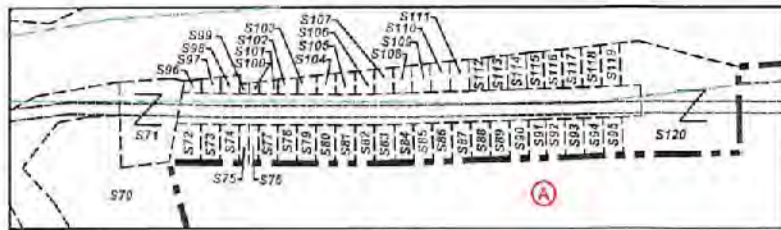
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD
FORT WORTH, TX 76107 CHARLESTON, WV 25313

COUNTY NAME
PERMIT

**WOODFORD LEASE
WELL 5HM
676.9119± ACRES**

JUL 16 2018

WV Department of
Environmental Protection



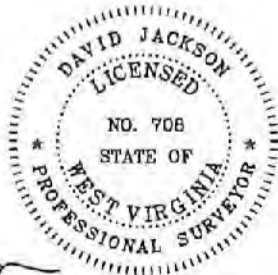
DETAIL "A"
Scale
1"=500'



DETAIL "B"
Scale
1"=500'

Number	TAX MAP-PARCEL	ADJOINER OWNER	ACRES
S1	05-07-43	CNX RCPC, LLC	155.7119
S2	05-12-08	Amita Rae Miller (Life)	100.35
S3	05-12-10	Consolidation Coal Co./ Murray Energy	13.75
S4	05-12-12.1	Lionel L. Persinger, Et Ux.	148.09
S5	05-12-12	Lionel L. Persinger, Et Ux.	45.0
S6	05-11-15	Lionel L. Persinger, Et Ux.	93.0
S7	05-15-01	Marcus Sharp & David Schlabach, Hrs.	121.0
S8	05-7B-49	Cassidy Rain Carpenter	1.1441
S9	05-7B-48	Cassidy Rain Carpenter	1.325
S10	05-07-43.3	Frank M. Mason	0.327
S11	05-07-43.2	Frank M. 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	57.0
S16	05-07-42.1	Holly Rice	5.99
S17	05-07-41	James A. Wade	1.0
S18	05-07-42.5	Matthew V. Conner, et al	3.791
S19	05-07-42	Tracy M. Kasterson	0.53
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	Jason Reed Hartley	0.94
S24	05-07-33	William N. Roupe	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 R. 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	5.0
S34	05-15-14	John David Petrock, et ux	25.0
S35	05-15-12	John David Petrock, et ux	150.23
S36	05-15-15	Robert L. Shields, et al	49.0
S37	05-14-12	Dale R. Gallaher, et al	135.100
S38	05-14-10	Adam T. & Jesse L. Robinson	110.715
S39	05-12-15	Woodland Hills Church of God Trs.	0.375
S40	05-12-21.1	Robert W. Jr. & Wendy L. Rigenbach	14.222
S41	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. Rigenbach, et ux	104.231
S45	05-12-02	CNX RCPC, LLC	60.68
S46	05-12-03	CNX RCPC, LLC	62.30
S47	05-12-05	CNX RCPC, LLC	61.883
S48	05-12-06	CNX RCPC, LLC	70.81
S49	05-12-6.2	Consolidation Coal Co./ Murray Energy	25.50

Number	TAX MAP-PARCEL	ADJOINER OWNER	ACRES
S50	05-12-2.1	Consolidation Coal Co./ Murray Energy	22.0
S51	05-12-01	U.S. of America	1.68
S52	05-07-43.4	Chalmer Campbell	0.295
S53	05-07-43.1	State Road Commission	1.48
S54	05-7A-17	Carol Martin & Harry L. Yoho	0.3067
S55	05-7A-18	Shelia R. Rutan	0.1530
S56	05-7A-19	Shelia R. Rutan	0.3060
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-28	Albert Joseph White, Est	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	05-7A-31	WVA Dept. of Natural Resources	3.18
S69	05-7A-32	Dawn Thompson Tennant	0.3091
S70	05-7A-02	CNX RCPC, LLC	2.23
S71	05-7A-01	Lucille Myers	0.529
S72	05-7B-25	Cindy D. Aliff	0.1673
S73	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-24	Cindy D. Aliff	0.0354
S97	05-7B-23	Cindy D. Aliff	0.0471
S98	05-7B-22	Patricia A. Johnson	0.0505
S99	05-7B-21	Patricia A. Johnson	0.0287
S100	05-7B-21.1	Patricia A. Johnson	0.0296
S101	05-7B-20	Patricia A. Johnson	0.0626
S102	05-7B-19	Cindy D. Aliff, et al	0.0712
S103	05-7B-18	Cindy D. Aliff, et al	0.0763
S104	05-7B-17	Albert J. Anderson, Jr.	0.0849
S105	05-7B-16	Albert J. Anderson, Jr.	0.0903
S106	05-7B-15	Albert J. Anderson, Jr.	0.0970
S107	05-7B-14	Albert J. Anderson, Jr.	0.0991
S108	05-7B-13	Albert J. Anderson, Jr.	0.1067
S109	05-7B-12	Teresa & Thomas Gouldsberry	0.1113
S110	05-7B-11	Teresa & Thomas Gouldsberry	0.1159
S111	05-7B-10	Teresa & Thomas Gouldsberry	0.1199
S112	05-7B-09	Teresa & Thomas Gouldsberry	0.1240
S113	05-7B-08	Teresa & Thomas Gouldsberry	0.1286
S114	05-7B-07	Teresa & Thomas Gouldsberry	0.1331
S115	05-7B-06	Teresa & Thomas Gouldsberry	0.1377
S116	05-7B-05	Daniel D. & Mary E. Robinson	0.1418
S117	05-7B-04	Daniel D. & Mary E. Robinson	0.1458
S118	05-7B-03	Daniel D. Robinson, et ux	0.1504
S119	05-7B-02	Daniel D. Robinson, et ux	0.1550
S120	05-7B-01	Patricia L. Robinson	1.257



P.S. 708 *David L Jackson*



TUG HILL
OPERATING

OPERATOR'S
WELL #: WOODFORD 5HM
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE 2 OF 2
DATE: 07/03/2018

WW-6A1
(5/13)

Operator's Well No. Wooford 5HM

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

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

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

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

*See attached pages

RECEIVED
Office of Oil and Gas

JUL 16 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 *Amy Miller*
 Its: Permitting Specialist

WW-6A1 Supplement

RECEIVED
Office of Oil and Gas

Operator's Well No. Woodford - 5HM

LEASE ID	TAG	PARCEL	GRANTOR, LESSOR, ETC.	GRANTEE, LESSEE, ETC.	ROYALTY	DEED BOOK/PAGE	ASSIGNMENT	ASSIGNMENT	ASSIGNMENT
041112	A	5-7-43	HG ENERGY II APPALACHIA LLC	TH EXPLORATION LLC	1/8+	691 363	N/A	N/A	Please see unrecorded Memorandum of Operating Agreement attached.
10*22604	B	5-12-8	WILLIAM LEESON	TH EXPLORATION LLC	1/8+	966 499	N/A	N/A	N/A
10*22605	B	5-12-8	MICHAEL R AND BRENDA R LEESON	TH EXPLORATION LLC	1/8+	966 496	N/A	N/A	N/A
10*22858	B	5-12-8	THOMAS C AND MARY ELLEN DAVIS	TH EXPLORATION LLC	1/8+	977 63	N/A	N/A	N/A
10*23004	B	5-12-8	KLOVA A MORRIS	TH EXPLORATION LLC	1/8+	977 382	N/A	N/A	N/A
10*18827	B	5-12-8	ERIN E SCHOLL	TH EXPLORATION LLC	1/8+	937 626	N/A	N/A	N/A
10*18835	B	5-12-8	REBECCA LYNN KIER AND ERIC JAMES KIER	TH EXPLORATION LLC	1/8+	937 405	N/A	N/A	N/A
10*18968	B	5-12-8	E SHIELA PAVLOVICH	TH EXPLORATION LLC	1/8+	940 291	N/A	N/A	N/A
10*18969	B	5-12-8	JEANNE MARIE VAN GROL AND RICHARD ARTHUR VAN GROL	TH EXPLORATION LLC	1/8+	941 289	N/A	N/A	N/A
10*19500	B	5-12-8	JAMES CONTRERAS AND CATHERINE CONTRERAS	TH EXPLORATION LLC	1/8+	942 608	N/A	N/A	N/A
10*19825	B	5-12-8	THOMAS A POWDERLY	TH EXPLORATION LLC	1/8+	945 639	N/A	N/A	N/A
10*19826	B	5-12-8	TERRANCE V POWDERLY SR	TH EXPLORATION LLC	1/8+	945 637	N/A	N/A	N/A
10*19827	B	5-12-8	CORINNE E VERNA AND JONATHAN C VERNA SR	TH EXPLORATION LLC	1/8+	945 635	N/A	N/A	N/A
10*19828	B	5-12-8	ANNE M AND JOHN LEACH	TH EXPLORATION LLC	1/8+	945 633	N/A	N/A	N/A
10*19829	B	5-12-8	MARGARET J WHITFORD AND LANCE W WHITFORD	TH EXPLORATION LLC	1/8+	945 631	N/A	N/A	N/A
10*19830	B	5-12-8	DAVID POWDERLY AND NANCY A POWDERLY	TH EXPLORATION LLC	1/8+	945 629	N/A	N/A	N/A
10*21002	B	5-12-8	STANLEY EUGENE STOWE	TH EXPLORATION LLC	1/8+	951 215	N/A	N/A	N/A
10*21045	B	5-12-8	SANDRA J HARMON AND WALTER D HARMON	TH EXPLORATION LLC	1/8+	951 217	N/A	N/A	N/A
10*21190	B	5-12-8	MARGARET CLICKNER	TH EXPLORATION LLC	1/8+	941 283	N/A	N/A	N/A
10*21223	B	5-12-8	EUGENE C GRIEB AND SHIRLEY K GRIEB	TH EXPLORATION LLC	1/8+	961 468	N/A	N/A	N/A
10*21607	B	5-12-8	SHERLEY R STOWE & KAREN M STOWE	TH EXPLORATION LLC	1/8+	959 474	N/A	N/A	N/A
10*21924	B	5-12-8	BEVERLY A MILLER	TH EXPLORATION LLC	1/8+	953 533	N/A	N/A	N/A
10*21926	B	5-12-8	VIOLA JANE BREON AND JAMES RONALD BREON	TH EXPLORATION LLC	1/8+	953 360	N/A	N/A	N/A
10*21929	B	5-12-8	BENNY MILLER	TH EXPLORATION LLC	1/8+	960 177	N/A	N/A	N/A
10*21930	B	5-12-8	JAMES A GRENOBLE AND MARY JANE GRENOBLE	TH EXPLORATION LLC	1/8+	953 263	N/A	N/A	N/A
10*21938	B	5-12-8	SEAN M GRENOBLE AND CHERYL A GRENOBLE	TH EXPLORATION LLC	1/8+	960 91	N/A	N/A	N/A
10*21939	B	5-12-8	ULA F NELSON	TH EXPLORATION LLC	1/8+	960 96	N/A	N/A	N/A
10*22051	B	5-12-8	NOEL A PARKS	TH EXPLORATION LLC	1/8+	960 509	N/A	N/A	N/A
10*22408	B	5-12-8	REBECCA S TARR	TH EXPLORATION LLC	1/8+	962 578	N/A	N/A	N/A
10*22349	B	5-12-8	ANITA RAE MILLER	AMERICAN PETROLEUM PARTNERS LLC	1/8+	910 152	N/A	N/A	American Petroleum Partners Operating, LLC to TH Exploration, LLC: 42/109
10*22744	B	5-12-8	BRIDGET A POWDERLY	TH EXPLORATION LLC	1/8+	881 29	N/A	N/A	N/A
10*22309	B	5-12-8	AARON D LITMAN AND BETTY J LITMAN	TH EXPLORATION LLC	1/8+	963 408	N/A	N/A	N/A
10*22311	B	5-12-8	WILLIAM L LITMAN AND VICKIE L LITMAN	TH EXPLORATION LLC	1/8+	963 404	N/A	N/A	N/A
10*22312	B	5-12-8	RICHARD WOOD AND VICKI WOOD	TH EXPLORATION LLC	1/8+	962 528	N/A	N/A	N/A

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10*22548	B	5-12-8	SHARON TOTER & HERVEY WILLIAMS	TH EXPLORATION LLC	1/8+	966	194	N/A	N/A	N/A
10*19751	C	5-12-10	THOMAS L ROBINSON	TH EXPLORATION LLC	1/8+	944	426	N/A	N/A	N/A
10*19752	C	5-12-10	PATRICIA ANKROM	TH EXPLORATION LLC	1/8+	944	447	N/A	N/A	N/A
10*19841	C	5-12-10	CAROLYN JEAN FERGUSON	TH EXPLORATION LLC	1/8+	945	641	N/A	N/A	N/A
10*19842	C	5-12-10	JAMES E ROBINSON AND CAMILLA L ROBINSON	TH EXPLORATION LLC	1/8+	945	643	N/A	N/A	N/A
10*19843	C	5-12-10	JOHN S ROBINSON AND SHERRIE J ROBINSON	TH EXPLORATION LLC	1/8+	945	646	N/A	N/A	N/A
10*19975	C	5-12-10	CHARLES F STEWART	TH EXPLORATION LLC	1/8+	948	270	N/A	N/A	N/A
10*16918	D	5-12-12.1	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	910	60	N/A	N/A	N/A
10*16908	E	5-12-12	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	910	51	N/A	N/A	N/A
10*14911	F	5-11-15	FORREST MILLER	GASTAR EXPLORATION USA INC	1/8+	819	316	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*17329	F	5-11-15	JOHN P ICARD AND REVA J ICARD	TH EXPLORATION LLC	1/8+	943	524	N/A	N/A	N/A
10*18174	F	5-11-15	THE ESTATE OF ROY JOSEPH LEACH	TH EXPLORATION LLC	1/8+	927	647	N/A	N/A	N/A
10*19642	F	5-11-15	NOEL A PARKS	TH EXPLORATION LLC	1/8+	944	92	N/A	N/A	N/A
10*21455	F	5-11-15	MELISSA MILLER GIBSON AND JAMES GIBSON	TH EXPLORATION LLC	1/8+	953	308	N/A	N/A	N/A
10*21939	F	5-11-15	ULA F NELSON	TH EXPLORATION LLC	1/8+	960	96	N/A	N/A	N/A
10*22134	F	5-11-15	JACK MICHAEL FOREMAN	TH EXPLORATION LLC	1/8+	961	449	N/A	N/A	N/A
10*22438	F	5-11-15	JULIE SPRINGWATER	TH EXPLORATION LLC	1/8+	964	231	N/A	N/A	N/A
10*21903	F	5-11-15	WILLIAM R VOLTZ AND SHARON VOLTZ	TH EXPLORATION LLC	1/8+	960	182	N/A	N/A	N/A
10*21904	F	5-11-15	MARY S MAGERS AND WILLIAMS MAGERS	TH EXPLORATION LLC	1/8+	960	158	N/A	N/A	N/A
10*21905	F	5-11-15	DAVID F VOLTZ AND LINDA VOLTZ	TH EXPLORATION LLC	1/8+	961	444	N/A	N/A	N/A
10*21906	F	5-11-15	MICHAEL P VOLTZ	TH EXPLORATION LLC	1/8+	960	164	N/A	N/A	N/A
10*21910	F	5-11-15	J THOMAS VOLTZ AND NANCY VOLTZ	TH EXPLORATION LLC	1/8+	960	179	N/A	N/A	N/A
10*16913	F	5-11-15	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	910	57	N/A	N/A	N/A
10*18045	F	5-11-15	KLOVA ANN MORRIS	TH EXPLORATION LLC	1/8+	927	114	N/A	N/A	N/A
10*22309	F	5-11-15	AARON D LITMAN AND BETTY J LITMAN	TH EXPLORATION LLC	1/8+	963	408	N/A	N/A	N/A
10*22311	F	5-11-15	WILLIAM L LITMAN AND VICKIE L LITMAN	TH EXPLORATION LLC	1/8+	963	404	N/A	N/A	N/A
10*22312	F	5-11-15	RICHARD WOOD AND VICKI WOOD	TH EXPLORATION LLC	1/8+	962	528	N/A	N/A	N/A
10*22559	F	5-11-15	SHARON TOTER & HERVEY WILLIAMS	TH EXPLORATION LLC	1/8+	966	94	N/A	N/A	N/A
10*47051.331.1	G	5-15-1	LEEANN M LEMONOVICH	TH EXPLORATION LLC	1/8+	910	136	N/A	N/A	N/A
10*14057	G	5-15-1	THE SAMUEL MILTON SHEETS TRUST	GASTAR EXPLORATION USA, INC.	1/8+	732	624	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14051	G	5-15-1	AMANDA L SMITH	GASTAR EXPLORATION USA, INC.	1/8+	727	572	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9

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10*14052	G	5-15-1	MAY ELIZABETH GALLAHER BROWNING	GASTAR EXPLORATION USA, INC.	1/8+	727	568	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14053	G	5-15-1	LARRY D. MCWHORTER	GASTAR EXPLORATION USA, INC.	1/8+	727	570	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14055	G	5-15-1	VICTOR PEDDICORD	GASTAR EXPLORATION USA, INC.	1/8+	730	193	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14056	G	5-15-1	WALLACE T. BERRY	GASTAR EXPLORATION USA, INC.	1/8+	731	156	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14058	G	5-15-1	NANCY HOFSTATTER	GASTAR EXPLORATION USA, INC.	1/8+	732	628	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14059	G	5-15-1	LAURA BERRY MCGLYNN	GASTAR EXPLORATION USA, INC.	1/8+	732	622	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14060	G	5-15-1	SUSAN E GORE	GASTAR EXPLORATION USA, INC.	1/8+	768	488	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14043	G	5-15-1	PATRICK R. WALSH	GASTAR EXPLORATION USA, INC.	1/8+	725	566	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14061	G	5-15-1	LINDA TAYLOR	GASTAR EXPLORATION USA, INC.	1/8+	770	476	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14062	G	5-15-1	REBECCA MCMILLAN	GASTAR EXPLORATION USA, INC.	1/8+	803	482	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9

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10*14063	G	5-15-1	DAVID BURKETT	GASTAR EXPLORATION USA, INC.	1/8+	803	480	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14044	G	5-15-1	JOSEPH WESLEY GALLAHER, II	GASTAR EXPLORATION USA, INC.	1/8+	724	232	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14045	G	5-15-1	LAMOYNE BAKER	GASTAR EXPLORATION USA, INC.	1/8+	724	236	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14046	G	5-15-1	CHARLES THOMPSON GALLAHER, II	GASTAR EXPLORATION USA, INC.	1/8+	724	234	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14047	G	5-15-1	LESLIE ANN BLYTHE	GASTAR EXPLORATION USA, INC.	1/8+	726	645	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14048	G	5-15-1	BRYANNA FLYNN RANKIN	GASTAR EXPLORATION USA, INC.	1/8+	727	3	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14049	G	5-15-1	WILDA WINTERS	GASTAR EXPLORATION USA, INC.	1/8+	726	643	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14050	G	5-15-1	JUDITH L. CHAMBERS	GASTAR EXPLORATION USA, INC.	1/8+	726	647	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9
10*14042	G	5-15-1	RALPH B TAYLOR	GASTAR EXPLORATION USA, INC.	1/8+	665	487	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Certificate of Merger of Gastar Exporation USA, Inc. to Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II, LLC: 36/9

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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
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ASSIGNMENTS
Book 42 @ Page 109
Pages Recorded 9
Recording Cost \$ 15.00

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STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

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

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

FURTHER, AFFIANT SAITH NOT.

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

David D. Kalish
Affiant: David D. Kalish

JURAT

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

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

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

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

My Commission Expires: 10-05-2020

Signature/Notary Public: Robin Bock

Name/Notary Public (Print): Robin Bock



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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As reflected above, either or both Operator and Non-Operator may become Debtors if they default in their payment obligations under the terms of the Operating Agreement. On default, the non-defaulting party(ies) will be considered secured party(ies).

The Operating Agreement contains other provisions which do not conflict but supplement the above-described provisions, including, but not limited to, non-consent provisions which provide that parties who elect not to participate in certain operations shall be deemed to have relinquished their interest until the consenting parties are able to recover their costs of such operations plus a specified amount. Should any person or firm desire additional information regarding the Operating Agreement or wish to inspect a copy of the Operating Agreement, said person or firm should contact the Operator.

For purposes of protecting said liens and security interest, the undersigned parties agree that this Memorandum covers all right, title and interest of the Debtors in:

Property Subject to Security Interests:

- (A) All personal property located upon or used in connection with the Contract Area.
- (B) All fixtures on the Contract Area.
- (C) All oil, gas and associated substances of value in, on or under the Contract Area, or which may be extracted therefrom.
- (D) All accounts and receivables resulting from the sale of the items described in subparagraph (C) at the wellhead of every well located on the Contract Area or on lands pooled therewith.
- (E) All items used, useful, or purchased for the production, treatment, handling, storage, transportation, processing, manufacture, or sale of the items described in subparagraph (C).
- (F) All accounts, contract rights, rights under any gas balancing agreement, general intangibles, equipment, inventory, farmout rights, option farmout rights, acreage and/or cash contributions, and conversions rights, whether now owned or existing or hereafter acquired or arising, including but not limited to all interest in any enterprise that holds, owns, or controls any interest in the Contract Area or in any property encumbered by this Memorandum.
- (G) All severed and extracted oil, gas and associated substances now or hereafter produced from or attributable to the Contract Area, including without limitation, oil, gas and associated substances in tanks or pipelines or otherwise held by any person or entity for treatment, storage, transportation, manufacture, processing or sale.
- (H) All the proceeds and products of the items described in the foregoing paragraphs now existing or hereafter arising, and all substitutions therefore, improvements and enhancements thereto, replacements thereof, or accessions thereto.
- (I) All personal property and fixtures now and hereafter acquired in furtherance of the purposes of this Operating Agreement. Certain of the above-described items are, or are to become, fixtures on the Contract Area.
- (J) The proceeds and products of collateral are also specifically covered.

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Property Subject to Liens:

- (A) All real property, within the Contract Area, including all oil, gas and associated substances of value in, on or under the Contract Area, or which may be extracted therefrom.
- (B) All fixtures within the Contract Area.
- (C) All real property and fixtures now and hereafter acquired in furtherance of the purposes of this Operating Agreement.

The above items will be financed at the wellhead of the well or wells located on the Contract Area, and this Memorandum is to be filed for record in the real estate records of the county and in the Uniform Commercial Code records in which the Contract Area is located.

On default of any covenant or condition of the Operating Agreement, in addition to any other remedy afforded by law, each party to the Operating Agreement and any successor to such party by assignment, operation of law, or otherwise, shall have, and is hereby given and vested with, the power and authority to take possession of and sell any interest which the defaulting party has in property identified above securing the obligations provided in the Operating Agreement and to foreclose this lien and security interest in the manner provided by law.

Upon expiration of the Operating Agreement and the satisfaction of all debts and outstanding interest, the Operator shall file of record a release and termination on behalf of all parties concerned. Upon the filing of such release and termination, all benefits and obligations under this Memorandum shall terminate as to all parties who have executed or ratified this Memorandum. In addition, the Operator shall have the right to file a continuation statement on behalf of all parties who have executed or ratified this Memorandum when Operator.

It is understood and agreed by the parties hereto that if any part, term or provision of this Memorandum is held to be illegal or in conflict with any applicable state or federal law or regulation, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Memorandum did not contain the particular part, term or provision held to be invalid.

This Memorandum shall be binding upon and shall inure to the benefit of the parties hereto and to their respective heirs, devisees, legal representatives, successors and assigns.

A party having an interest in the Contract Area can ratify this Memorandum by execution hereof or a separate counterpart hereof or by execution and delivery of an instrument of ratification, adopting the provisions of this Memorandum or agreeing to be bound by the terms hereof. Any such ratification shall have the same effect as if the ratifying party had executed this Memorandum or a counterpart thereof. By execution or ratification of this Memorandum, such party hereby consents to its ratification and adoption by any party who may have or may acquire any interest in the Contract Area.

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The parties hereto agree to execute, acknowledge and deliver or cause to be executed, acknowledged and delivered any instrument, or take any action necessary or appropriate to effectuate the terms of the Operating Agreement or any Exhibit, instrument, certificate or other document pursuant thereto.

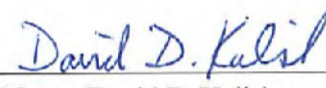
This Memorandum may be executed or ratified in one or more counterparts and all of the executed or ratified counterparts shall together constitute one instrument. For purpose of recording, only one copy of this Memorandum with individual signature pages attached thereto needs to be filed of record.

Executed this 1st day of July, 2018.

OPERATOR: TH Exploration, LLC

By: 
Sean Willis, Sr. Vice President

NON-OPERATOR: TH Exploration II, LLC

By: 
Name: David D. Kalish
Title: Sr. Vice President - Land

NON-OPERATOR: HG Energy II Appalachia, LLC

By: _____
Name: Jared Hall
Title: President

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Environmental Protection

ACKNOWLEDGEMENT

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF WASHINGTON)

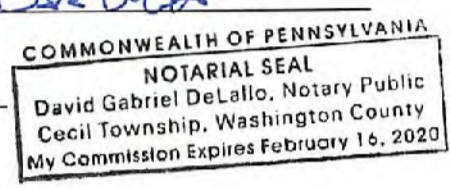
4705102075

On this the 11th day of July 2018, before me, a notary public, the undersigned authority, personally appeared Sean Willis, who acknowledged his self to be the Sr. Vice President of TH Exploration, LLC, a limited liability company, and that he as such Sr. Vice President being authorized to do so, executed the foregoing instrument for the purposed therein contained by signing the name of the limited liability company by his self as Sr. Vice President.

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

My Commission Expires: 2/16/2020 Signature/Notary Public: [Signature]

Name/Notary Public (print): DAVID G. DeLallo



ACKNOWLEDGEMENT

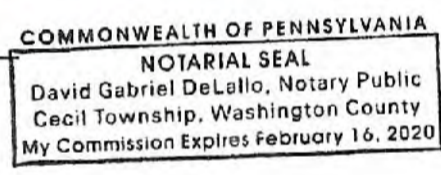
COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF WASHINGTON)

On this the 11th day of July 2018, before me, a notary public, the undersigned authority, personally appeared David D. Kalish, who acknowledged his self to be the Sr. Vice President - Land of TH Exploration II, LLC, a limited liability company, and that he as such Sr. Vice President - Land being authorized to do so, executed the foregoing instrument for the purposed therein contained by signing the name of the limited liability company by his self as Sr. Vice President - Land.

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

My Commission Expires: 2/16/2020 Signature/Notary Public: [Signature]

Name/Notary Public (print): DAVID G. DeLallo



ACKNOWLEDGEMENT

STATE OF WEST VIRGINIA)
) SS:
COUNTY OF WOOD)

This instrument was acknowledged before me on the ___ day of _____, 2018 by **Jared Hall**, as President of HG Energy II Appalachia, LLC, a Delaware limited liability company, on behalf of said company.

Given under my hand and seal this the ___ day of _____, 2018.

Notary Public, State of _____

Prepared by and please return to:
TH Exploration, LLC
380 Southpointe Boulevard, Suite 200
Canonsburg, PA 15317

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WV Department of
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The parties hereto agree to execute, acknowledge and deliver or cause to be executed, acknowledged and delivered any instrument, or take any action necessary or appropriate to effectuate the terms of the Operating Agreement or any Exhibit, instrument, certificate or other document pursuant thereto.

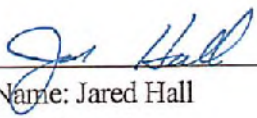
This Memorandum may be executed or ratified in one or more counterparts and all of the executed or ratified counterparts shall together constitute one instrument. For purpose of recording, only one copy of this Memorandum with individual signature pages attached thereto needs to be filed of record.

Executed this 1st day of July, 2018.

OPERATOR: TH Exploration, LLC

By: _____
Name: _____
Title: _____

NON-OPERATOR: HG Energy II Appalachia, LLC

By:  _____
Name: Jared Hall
Title: President

NON-OPERATOR: TH Exploration II, LLC

By: _____
Name: _____
Title: _____

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ACKNOWLEDGEMENT

STATE OF _____)
) SS:
COUNTY OF _____)

On this the _____ day of _____ 2018, before me, a notary public, the undersigned authority, personally appeared Sean Willis, who acknowledged his self to be the Sr. Vice President of TH Exploration, LLC, a limited liability company, and that he as such Sr. Vice President being authorized to do so, executed the foregoing instrument for the purposed therein contained by signing the name of the limited liability company by his self as Sr. Vice President.

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

My Commission Expires: _____ Signature/Notary Public: _____

Name/Notary Public (print): _____

ACKNOWLEDGEMENT

STATE OF _____)
) SS:
COUNTY OF _____)

On this the _____ day of _____ 2018, before me, a notary public, the undersigned authority, personally appeared David D. Kalish, who acknowledged his self to be the Sr. Vice President - Land of TH Exploration II, LLC, a limited liability company, and that he as such Sr. Vice President - Land being authorized to do so, executed the foregoing instrument for the purposed therein contained by signing the name of the limited liability company by his self as Sr. Vice President - Land.

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

My Commission Expires: _____ Signature/Notary Public: _____

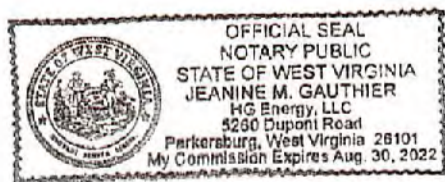
Name/Notary Public (print): _____

ACKNOWLEDGEMENT

STATE OF WEST VIRGINIA)
) SS:
COUNTY OF WOOD)

This instrument was acknowledged before me on the 11 day of July, 2018 by Jared Hall, as President of HG Energy II Appalachia, LLC, a Delaware limited liability company, on behalf of said company.

Given under my hand and seal this the 11 day of July, 2018.



Jeanine M. Gauthier
Notary Public, State of West Virginia

Prepared by and please return to:
TH Exploration, LLC
380 Southpointe Boulevard, Suite 200
Canonsburg, PA 15317

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Environmental Protection



4705102075
TUG HILL

July 6, 2018

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

RE: Wooford 5HM

Subject: Marshall County Route 76/1 Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 76/1 in the area reflected on the Woodford 5HM well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

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

Sincerely,

Amy Miller
Permit Specialist – Appalachia Region
Cell 304-376-0111
Email: amiller@tug-hillop.com

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WV Department of
Environmental Protection

4705-02075

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

Date of Notice Certification: 07/06/2018

API No. 47- 051
Operator's Well No. Woodford 5HM
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:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>516,093.78</u>
County:	<u>Marshall</u>		Northing:	<u>4,406,036.45</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Burch Ridge Road (County Route 26)</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>			

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input checked="" type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 40px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
<p>RECEIVED Office of Oil and Gas JUL 16 2018 WV Department of Environmental Protection</p>	

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.

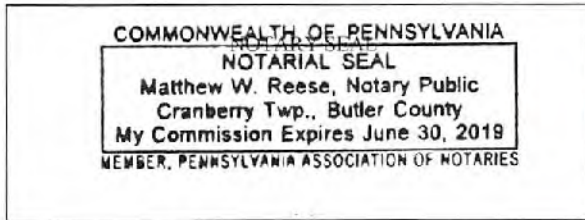
4705 * 02075

Certification of Notice is hereby given:

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

Well Operator: Tug Hill Operating, LLC
By: Amy L. Miller *Amy L. Miller*
Its: Permitting Specialist
Telephone: 724-749-8388

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030
Email: amiller@tug-hilop.com



Subscribed and sworn before me this 6th day of July 2018.
[Signature] Notary Public
My Commission Expires June 30, 2019

Oil and Gas Privacy Notice:

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

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WV Department of
Environmental Protection

**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: 7/6/2018 **Date Permit Application Filed:** 7/9/2018

Notice of:

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JUL 16 2018

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

WV Department of Environmental Protection

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

JUL 16 2018

API NO. 4705102075
OPERATOR WELL NO. Woodford 5HM
Well Pad Name: Woodford

WV Department of
Environmental Protection

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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WV Department of
Environmental Protection

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

Time Limits and Methods for Filing Comments.

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

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

Comment Requirements

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

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

Permit Denial or Condition

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

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

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

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

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WW-6A
(8-13)

API NO. 47-051 -
OPERATOR WELL NO. Woodford 5HM
Well Pad Name: Woodford

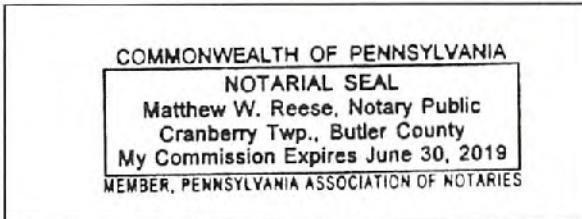
Notice is hereby given by:

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

Address: 380 Southpointe Boulevard, Plaza, Suite 200 **4705 02075**
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 deprivacyofficer@wv.gov.



Subscribed and sworn before me this 6th day of Jul., 2018.
Matthew W. Reese Notary Public
My Commission Expires June 30, 2019

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WW-6A Additional Parties to Notice Information**Well: Woodford 5HM****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 5HM
 District: Franklin
 County: Marshall
 State: WV

There appears to be Seventeen (17) 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. (Apts 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 7 Par. 42.1 Holly Rice 304-843-2212 657 Long Run Rd. Proctor, WV 26055

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4705102075

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

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WW-6A

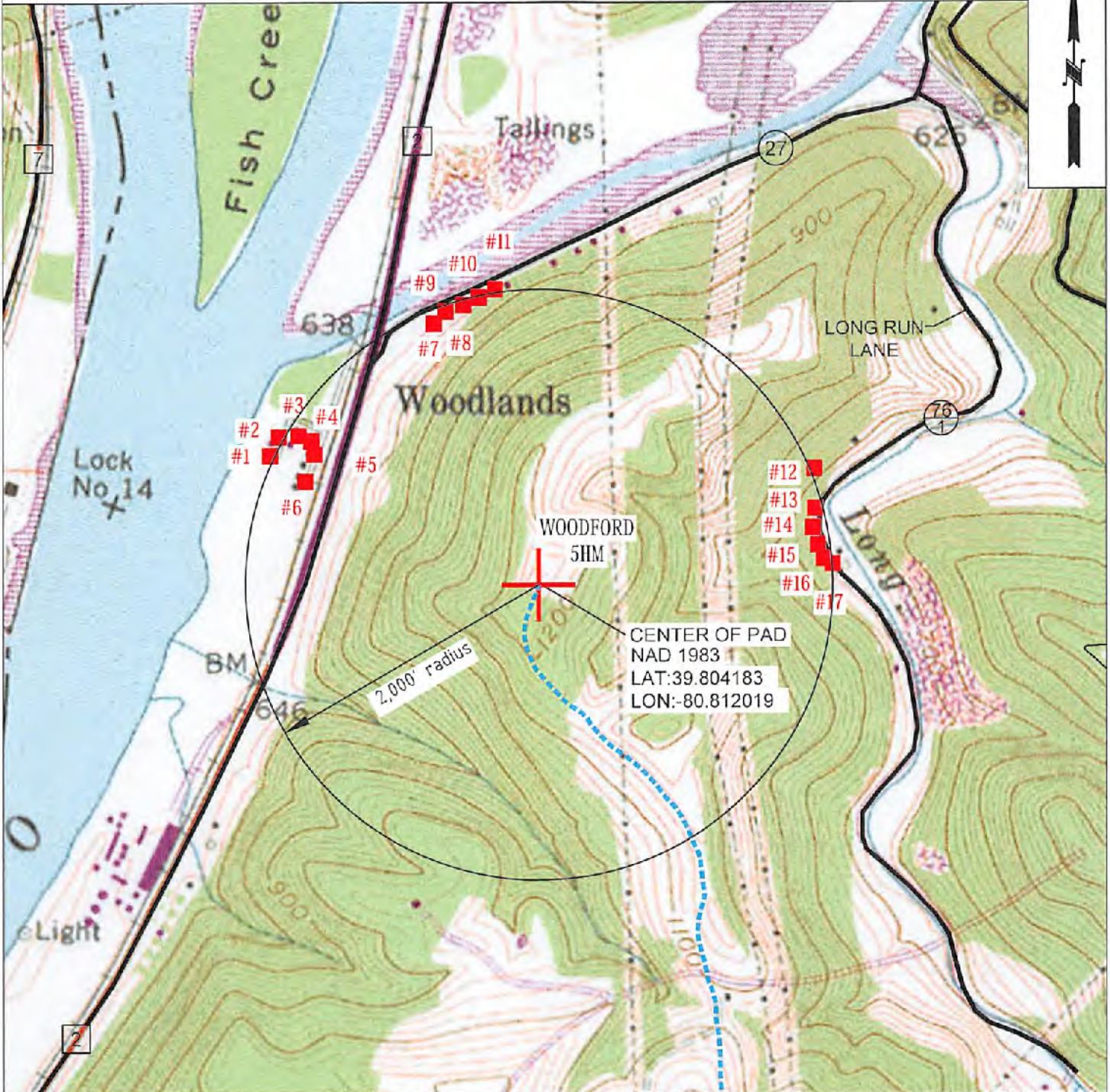
JUL 16 2018

**PROPOSED
WOODFORD 5HM**

4705102075 SUPPLEMENT PG 1

WV Department of
Environmental Protection

There appears to be Seventeen (17) possible water sources within 2,000'.



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: 07-04-2018	

WW-6A3
(1/12)

JUL 16 2018

WV Department of
Environmental ProtectionOperator Well No. Woodford 5HM

4705-02075

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: GNX Land Resources, LLC Attn: Casey Saunders
Address: 1000 Consol Energy Drive
Canonsburg, PA 15316 (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 Farmall 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

Notice is hereby given:

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

State:	<u>West Virginia</u>	Approx. Latitude & Longitude:	<u>39.80419523 ; -80.81200643</u>
County:	<u>Marshall</u>	Public Road Access:	<u>Burch Ridge Road - County Route 29</u>
District:	<u>Franklin</u>	Watershed:	<u>Fish Creek - Ohio River (HUC 10)</u>
Quadrangle:	<u>Powhatan Point</u>	Generally used farm name:	<u></u>

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 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:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
Telephone:	<u>724-749-8388</u>		<u>Canonsburg, PA 15317</u>
Email:	<u>amiller@tug-hillco.com</u>	Facsimile:	<u>724-338-2030</u>

Oil and Gas Privacy Notice:

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

WW-6A3 Additional Parties to Notice Information

Well: Woodford 5HM

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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WV Department of
Environmental Protection

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE 4700 5ND 0A8 0 7 5
NOTICE OF PLANNED OPERATION

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

Date of Notice: 07/06/2018 **Date Permit Application Filed:** 07/11/2018

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

- CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

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

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

Name: 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>516,093.78</u>
County:	<u>Marshall</u>		Northing:	<u>4,406,036.46</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.com

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

Oil and Gas Privacy Notice:

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WW-6A5 Additional Parties to Notice Information**Well: Woodford 5HM****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
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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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4705-02075



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways

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

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

June 19, 2018

Jill M. Newman
Deputy Commissioner

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

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

Woodford 5HM

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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JUL 16 2018
WV Department of
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4705 + 02075



PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

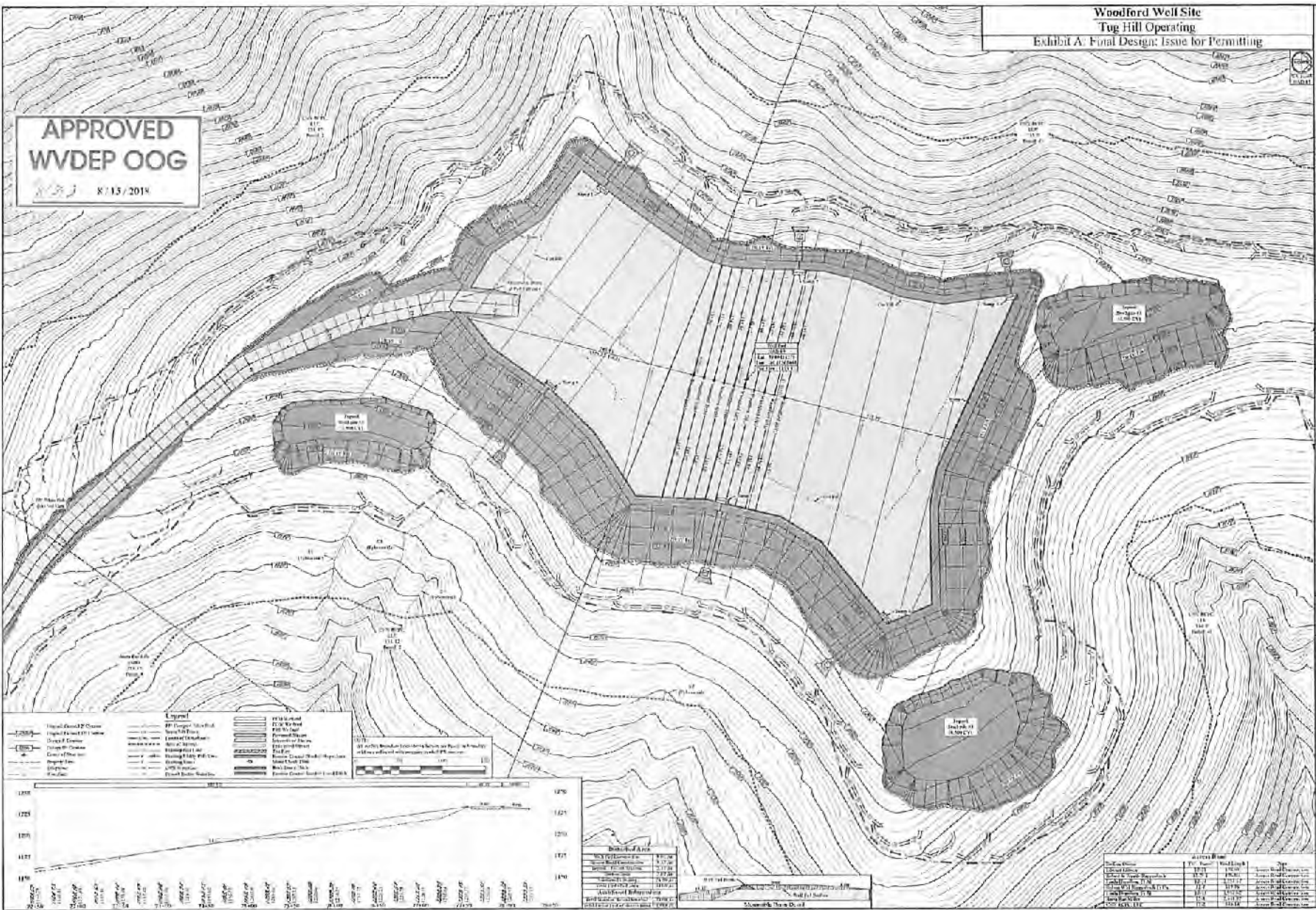
Well No. Woodford 5HM

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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Woodford Well Site
Tug Hill Operating
Exhibit A: Final Design: Issue for Permitting

APPROVED
WVDEP OOG
8/13/2014



Site Plan
Woodford Well Site
Franklin District
Marshall County, WV

TUG HILL OPERATING

THE STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL POLICY AND NATURAL RESOURCES

WVDEP

NO.	DESCRIPTION	DATE	BY
1	Issue for Permitting	8/13/2014	J. M. [Name]
2	Final Design	8/13/2014	J. M. [Name]
3	Final Design	8/13/2014	J. M. [Name]
4	Final Design	8/13/2014	J. M. [Name]
5	Final Design	8/13/2014	J. M. [Name]
6	Final Design	8/13/2014	J. M. [Name]
7	Final Design	8/13/2014	J. M. [Name]
8	Final Design	8/13/2014	J. M. [Name]
9	Final Design	8/13/2014	J. M. [Name]
10	Final Design	8/13/2014	J. M. [Name]
11	Final Design	8/13/2014	J. M. [Name]
12	Final Design	8/13/2014	J. M. [Name]
13	Final Design	8/13/2014	J. M. [Name]
14	Final Design	8/13/2014	J. M. [Name]
15	Final Design	8/13/2014	J. M. [Name]
16	Final Design	8/13/2014	J. M. [Name]
17	Final Design	8/13/2014	J. M. [Name]
18	Final Design	8/13/2014	J. M. [Name]
19	Final Design	8/13/2014	J. M. [Name]
20	Final Design	8/13/2014	J. M. [Name]
21	Final Design	8/13/2014	J. M. [Name]
22	Final Design	8/13/2014	J. M. [Name]
23	Final Design	8/13/2014	J. M. [Name]
24	Final Design	8/13/2014	J. M. [Name]
25	Final Design	8/13/2014	J. M. [Name]
26	Final Design	8/13/2014	J. M. [Name]
27	Final Design	8/13/2014	J. M. [Name]
28	Final Design	8/13/2014	J. M. [Name]
29	Final Design	8/13/2014	J. M. [Name]
30	Final Design	8/13/2014	J. M. [Name]
31	Final Design	8/13/2014	J. M. [Name]
32	Final Design	8/13/2014	J. M. [Name]
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100	Final Design	8/13/2014	J. M. [Name]