



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

Harold D. Ward, Cabinet Secretary
www.dep.wv.gov

Monday, July 12, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

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

Re: Permit Modification Approval for VAN WINKLE S-13HM
47-051-02362-00-00

Lateral Extension

TUG HILL OPERATING, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before 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: VAN WINKLE S-13HM
Farm Name: XCL MIDSTREAM OPERATING, LLC
U.S. WELL NUMBER: 47-051-02362-00-00
Horizontal 6A New Drill
Date Modification Issued: July 12, 2021

Promoting a healthy environment.

07/16/2021



June 11, 2021

CHARLES T. BREWER
WV DEP OFFICE OF OIL & GAS
601 57TH STREET SE
CHARLESTON, WV 25304-2345

VIA USPS

RE: **Van Winkle S-13HM Permit Modification (47-051-02362)**
Meade District, Marshall County, WV

Dear Taylor:

Tug Hill Operating, LLC is submitting a permit modification for its permitted well, Van Winkle S-13HM to add 12,683.52' to the lateral length. Therefore, enclosed please find the following:

- Modified WW-6B with changes highlighted in yellow
- Updated well plat
- Updated WW-6A1 information

If you have any questions or need any additional information, please do not hesitate to call me on (304) 376-0111. Thank you for attention to this matter, it is greatly appreciated.

Sincerely,

AMY MORRIS
PERMIT SPECIALIST-APPALACHIA REGION
TUG HILL OPERATING, LLC

Enclosures

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

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

2) Operator's Well Number: Van Winkle S-13HM Well Pad Name: Hunter Pethel

3) Farm Name/Surface Owner: XcL Midstream Operating, LLC Public Road Access: County Route 74

4) Elevation, current ground: 754' Elevation, proposed post-construction: 754'

5) Well Type (a) Gas Oil Underground Storage

Other

(b) If Gas Shallow Deep

Horizontal

6) Existing Pad: Yes or No Yes *D.S. 5-5-21*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6147' - 8197', thickness of 50' and anticipated pressure of approx. 3800 psi.

8) Proposed Total Vertical Depth: 6,297'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 20,891'

11) Proposed Horizontal Leg Length: 14,318.44'

12) Approximate Fresh Water Strata Depths: 70; 415'

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

14) Approximate Saltwater Depths: 870'

15) Approximate Coal Seam Depths: Sewickley Coal - 314' and Pittsburgh Coal - 409'

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

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

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

Depth: _____

Seam: _____

Owner: _____

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18)

CASING AND TUBING PROGRAM

TYPE	<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#	515' ✓	515'	708ft ³ (CTS)
Coal	13 3/8"	NEW	J55	54.5#	515' ✓	515'	708ft ³ (CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,226' ✓	2,226'	723ft ³ (CTS)
Production	5 1/2"	NEW	P110	20#	20,891' ✓	20,891'	5316ft ³ (CTS)
Tubing	2 3/8"	NEW	N80	4.7#		5,817'	
Liners							

B.S. 5-5-21

TYPE	<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 1/2"	.38	2,740	2,192	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.38	2,740	2,192	SEE #24	1.2
Intermediate	9 5/8"	12 1/4"	.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			RECEIVED Office of Oil and Gas JUN 14 2021 WV Department of Environmental Protection
Sizes:	N/A			
Depths Set:	N/A			

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

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

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

Well to be completed with approximately 35,800,000 lb proppant and 27,100,000 gallons of water. Max rate = 80 bpm; max psi = 9,000#.

B.S. 5-5-21

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 16.63 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.87 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:

Sfc - Premium NE-1 + 2% CaCl; Int1 - Premium NE-1 + 1.5% CaCL + Flake; Int2 - Lead: Premium NE-1 + 5% BA-90 + .85% R-3 + 3% KCl + .75 gals/100sk FP-13L + 1% MPA-170 Tail: Premium NE-1 + .1% R-3 + 5% KCl + 1% CD-32 + .4% FL-52 + .2% ASA-301 + .6% Sodium Metasilicate; Kick Plug - Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L; Prod - Lead: 50:50 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .75 gal/100sk FP-13L Tail: 25:75 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .375 gal/100sk FP-13L

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

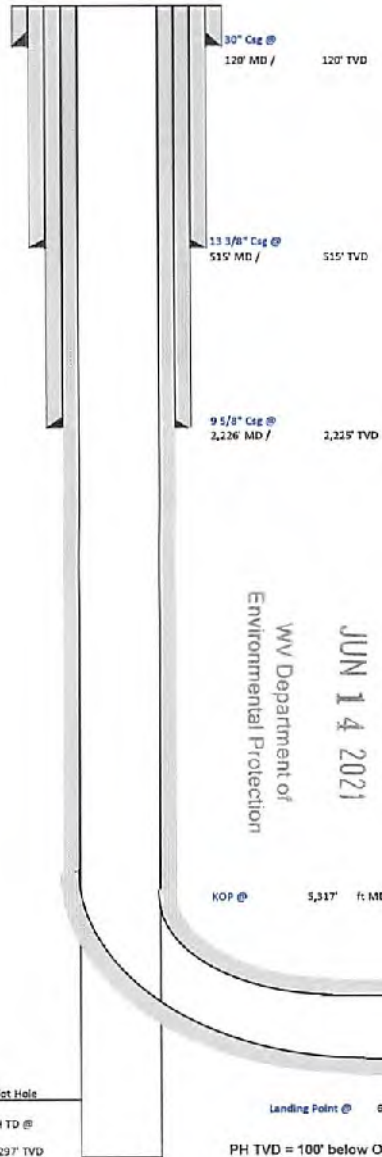


WELL NAME: Van Winkle S-13HM
STATE: WV **COUNTY:** Marshall
DISTRICT: Meade
DF Elev: 754' **GL Elev:** 754'
TD: 20,891'
TH Latitude: 39.781696
TH Longitude: -80.726659
BH Latitude: 39.747345
BH Longitude: -80.70018

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	415
Sewickley Coal	314
Pittsburgh Coal	409
Big Lime	1634
Wet	1926
Berea	2125
Gordon	2305
Rhinestreet	5512
Genesee/Burkett	8017
Tully	9044
Hamilton	6079
Marcellus	6147
Landing Depth	6182
Onondaga	6197
Pilot Hole Depth	6297

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'	8W	BW	Surface
Surface	17.5	13 3/8	515'	515'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,226'	2,225'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	20,891'	6,431'	20	CYHP110	Surface

CEMENT SUMMARY			DRILLING DETAILS		
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	687	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	756	A	15	Air	1 Centralizer every other jt.
Production	4,892	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to slc



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Pilot Hole
 PH TD @ 6,297' TVD
 Landing Point @ 6,575' MD / 6,182' TVD
 PH TVD = 100' below Onondaga Top

Lateral TD @ 20,891' ft MD
 6,431' ft TVD



Tug Hill Operating, LLC Casing and Cement Program

Van Winkle S-13HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	515'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,226'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4	20,891'	CTS

Cement

- Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.8 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: Van Winkle S-13 HM (slot N)
 Site: Van Winkle
 Project: Marshall County, West Virginia
 Design: rev1
 Rig:

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
2	1500.00	0.00	0.000	1500.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2 1/100' build
3	1650.00	3.00	354.050	1649.93	3.90	-0.41	2.00	354.050	-3.56	Begin 3.00' tangent
4	2650.00	3.00	354.050	2648.56	55.96	-5.83	0.00	0.000	-51.00	Begin 2 1/100' drop
5	2600.00	0.00	354.050	2798.49	59.86	-6.24	2.00	180.000	-54.56	Begin vertical hold
6	3951.51	0.00	354.050	3950.00	59.86	-6.24	0.00	354.050	-54.56	Begin 2 1/100' build
7	5023.10	21.43	354.051	4995.78	256.89	-25.77	2.00	354.051	-234.11	Begin 21.43' tangent
8	5317.38	21.43	354.051	5270.71	363.84	-37.81	0.00	0.000	-331.58	Begin 8 1/100' build/turn
9	6180.73	50.00	143.515	6046.29	239.40	167.92	8.00	155.373	-119.04	Begin 10 1/100' build/turn
10	6575.46	89.00	150.183	6182.00	-65.53	363.75	10.00	10.523	243.17	Begin 89.00' lateral
11	20891.29	89.00	150.183	6431.00	-12484.33	7480.93	0.00	0.000	4554.13	PBHL/TD 20891.29 MD/6431.00 TVD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Van Winkle S-13HM LP r1 - plan hits target center	6182.00	-65.52	363.74	14447293.35	1717573.06	39.78151300	-80.72536500
Van Winkle S-13HM PBHL r1 - plan hits target center	6431.00	-12484.33	7480.93	14434874.58	1724690.25	39.74734500	-80.70018000

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 @ 754.00ft

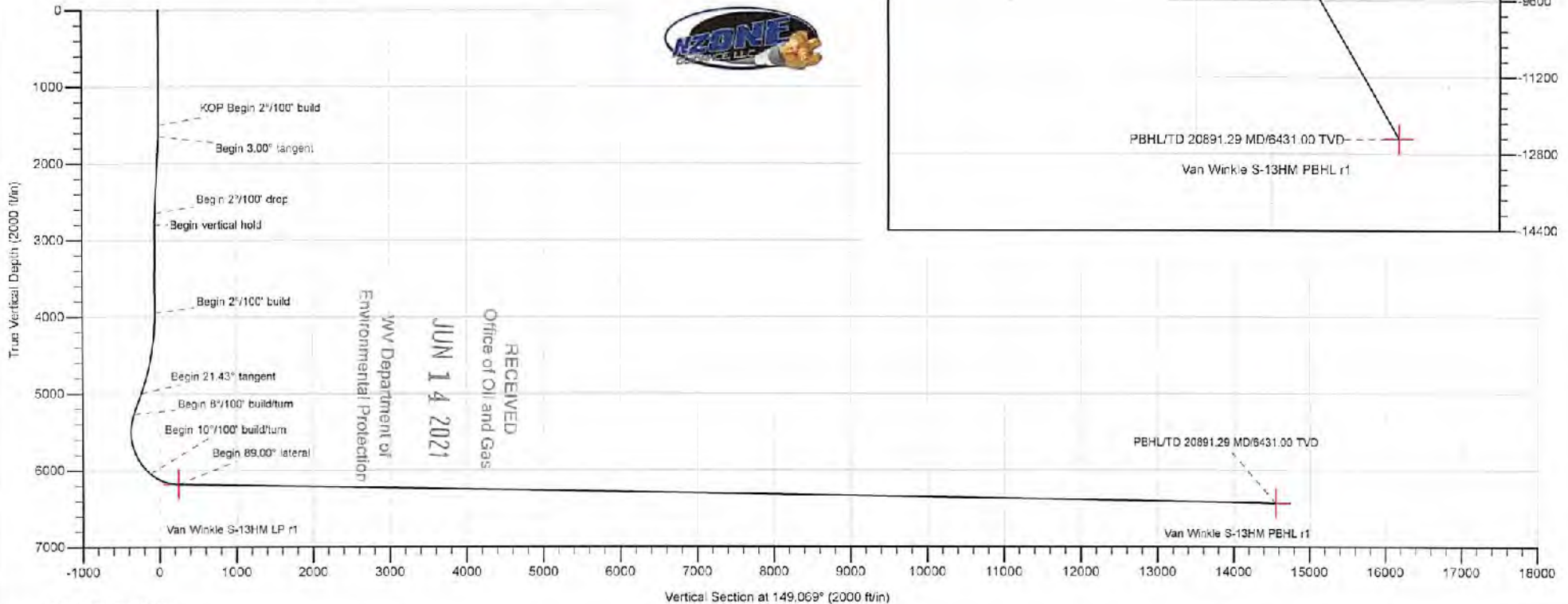
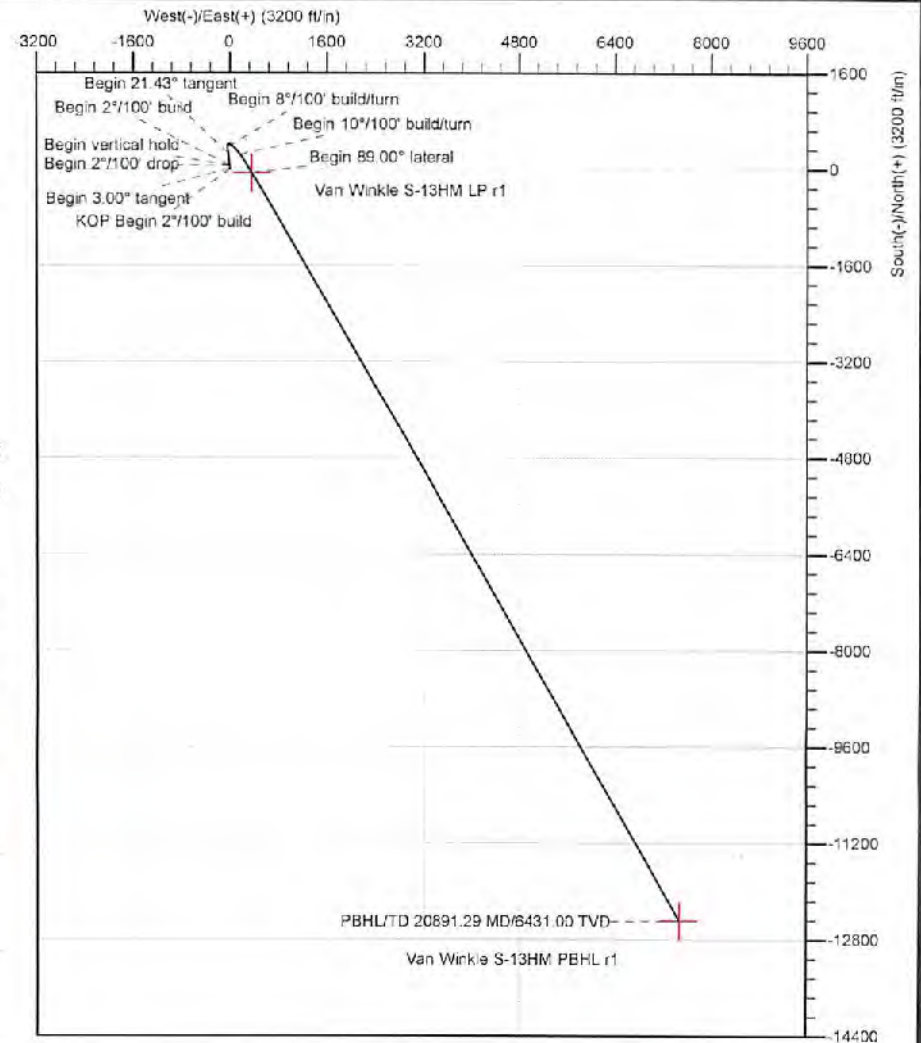
Northing	Easting	Latitude	Longitude
14447358.88	1717209.34	39.78169600	-80.72665900

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.821°



Azimuths to Grid North
 True North: 0.17°
 Magnetic North: 8.82°

Magnetic Field
 Strength: 51812.2snT
 Dip Angle: 66.60°
 Date: 11/13/2020
 Model: IGRF2020



Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Van Winkle S-13 HM (slot N)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 754.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 754.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle S-13 HM (slot N)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

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	Van Winkle				
Site Position:		Northing:	14,447,369.50 usft	Latitude:	39.78172533
From:	Lat/Long	Easting:	1,717,188.44 usft	Longitude:	-80.72673327
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.175 °

Well	Van Winkle S-13 HM (slot N)					
Well Position	+N-S	0.00 ft	Northing:	14,447,358.88 usft	Latitude:	39.78169600
	+E/-W	0.00 ft	Easting:	1,717,209.34 usft	Longitude:	-80.72665900
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	754.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	11/13/2020	-8.648	65.595	51,812.20505545

Design	rev1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	149.069

Plan Survey Tool Program	Date	11/17/2020		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	20,891.29 rev1 (Original Hole)	MWD MWD - Standard	

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Planning Report - Geographic



Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Van Winkle S-13 HM (slot N)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 754.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 754.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle S-13 HM (slot N)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

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	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	
1,500.00	0.00	0.000	1,500.00	0.00	0.00	0.00	0.00	0.00	0.000	
1,650.00	3.00	354.050	1,649.93	3.90	-0.41	2.00	2.00	0.00	354.050	
2,650.00	3.00	354.050	2,648.56	55.96	-5.83	0.00	0.00	0.00	0.000	
2,800.00	0.00	354.050	2,798.49	59.86	-6.24	2.00	-2.00	0.00	180.000	
3,951.51	0.00	354.050	3,950.00	59.86	-6.24	0.00	0.00	0.00	354.050	
5,023.10	21.43	354.051	4,996.78	256.89	-26.77	2.00	2.00	0.00	354.051	
5,317.38	21.43	354.051	5,270.71	363.84	-37.91	0.00	0.00	0.00	0.000	
6,180.73	50.00	143.515	6,046.29	239.40	167.92	8.00	3.31	17.31	155.373	
6,575.46	89.00	150.183	6,182.00	-65.53	363.75	10.00	9.88	1.69	10.523	
20,891.29	89.00	150.183	6,431.00	-12,484.33	7,480.93	0.00	0.00	0.00	0.000	Van Winkle S-13HM F

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Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Van Winkle S-13 HM (slot N)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 754.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 754.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle S-13 HM (slot N)	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	0.000	0.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
100.00	0.00	0.000	100.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
200.00	0.00	0.000	200.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
300.00	0.00	0.000	300.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
400.00	0.00	0.000	400.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
500.00	0.00	0.000	500.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
600.00	0.00	0.000	600.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
700.00	0.00	0.000	700.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
800.00	0.00	0.000	800.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
900.00	0.00	0.000	900.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
1,000.00	0.00	0.000	1,000.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
1,100.00	0.00	0.000	1,100.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
1,200.00	0.00	0.000	1,200.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
1,300.00	0.00	0.000	1,300.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
1,400.00	0.00	0.000	1,400.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
1,500.00	0.00	0.000	1,500.00	0.00	0.00	14,447,358.88	1,717,209.34	39.78169600	-80.72665900	
KOP Begin 2°/100' build										
1,600.00	2.00	354.050	1,599.98	1.74	-0.18	14,447,360.62	1,717,209.15	39.78170077	-80.72665963	
1,650.00	3.00	354.050	1,649.93	3.90	-0.41	14,447,362.78	1,717,208.93	39.78170673	-80.72666041	
Begin 3.00° tangent										
1,700.00	3.00	354.050	1,699.86	6.51	-0.68	14,447,365.39	1,717,208.66	39.78171388	-80.72666134	
1,800.00	3.00	354.050	1,799.73	11.71	-1.22	14,447,370.59	1,717,208.11	39.78172818	-80.72666322	
1,900.00	3.00	354.050	1,899.59	16.92	-1.76	14,447,375.80	1,717,207.57	39.78174248	-80.72666509	
2,000.00	3.00	354.050	1,999.45	22.12	-2.31	14,447,381.00	1,717,207.03	39.78175678	-80.72666697	
2,100.00	3.00	354.050	2,099.31	27.33	-2.85	14,447,386.21	1,717,206.49	39.78177108	-80.72666884	
2,200.00	3.00	354.050	2,199.18	32.53	-3.39	14,447,391.41	1,717,205.94	39.78178538	-80.72667072	
2,300.00	3.00	354.050	2,299.04	37.74	-3.93	14,447,396.62	1,717,205.40	39.78179968	-80.72667259	
2,400.00	3.00	354.050	2,398.90	42.95	-4.48	14,447,401.83	1,717,204.86	39.78181398	-80.72667447	
2,500.00	3.00	354.050	2,498.77	48.15	-5.02	14,447,407.03	1,717,204.32	39.78182828	-80.72667634	
2,600.00	3.00	354.050	2,598.63	53.36	-5.56	14,447,412.24	1,717,203.77	39.78184258	-80.72667821	
2,650.00	3.00	354.050	2,648.56	55.96	-5.83	14,447,414.84	1,717,203.50	39.78184973	-80.72667915	
Begin 2°/100' drop										
2,700.00	2.00	354.050	2,698.51	58.13	-6.06	14,447,417.01	1,717,203.26	39.78185569	-80.72667993	
2,800.00	0.00	354.050	2,798.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
Begin vertical hold										
2,900.00	0.00	0.000	2,898.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,000.00	0.00	0.000	2,998.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,100.00	0.00	0.000	3,098.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,200.00	0.00	0.000	3,198.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,300.00	0.00	0.000	3,298.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,400.00	0.00	354.050	3,398.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,500.00	0.00	354.050	3,498.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,600.00	0.00	0.000	3,598.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,700.00	0.00	0.000	3,698.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,800.00	0.00	0.000	3,798.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,900.00	0.00	0.000	3,898.49	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
3,951.51	0.00	0.000	3,950.00	59.86	-6.24	14,447,418.74	1,717,203.10	39.78186046	-80.72668056	
Begin 2°/100' build										
4,000.00	0.97	354.051	3,998.49	60.27	-6.28	14,447,419.15	1,717,203.05	39.78186158	-80.72668070	
4,100.00	2.97	354.051	4,098.43	63.69	-6.64	14,447,422.57	1,717,202.70	39.78187057	-80.72668194	
4,200.00	4.97	354.051	4,198.18	70.58	-7.36	14,447,429.46	1,717,201.98	39.78188988	-80.72668441	
4,300.00	6.97	354.051	4,297.63	80.92	-8.43	14,447,439.80	1,717,200.90	39.78191830	-80.72668814	
4,400.00	8.97	354.051	4,396.86	94.71	-9.87	14,447,453.59	1,717,199.47	39.78195618	-80.72669310	
4,500.00	10.97	354.051	4,495.15	111.93	-11.66	14,447,470.81	1,717,197.67	39.78200349	-80.72669930	

REC-8072668056
Office of Environmental
JUN 14 2021

WV Department of Environmental
307-266-1941



Planning Report - Geographic



Database: DB_Aug1919_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Van Winkle
 Well: Van Winkle S-13 HM (slot N)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Van Winkle S-13 HM (slot N)
 TVD Reference: GL @ 754.00ft
 MD Reference: GL @ 754.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,600.00	12.97	354.051	4,592.97	132.56	-13.81	14,447,491.44	1,717,195.52	39.78206015	-80.72670673	
4,700.00	14.97	354.051	4,690.01	156.57	-16.32	14,447,515.45	1,717,193.02	39.78212611	-80.72671537	
4,800.00	16.97	354.051	4,786.14	183.93	-19.17	14,447,542.81	1,717,190.17	39.78220128	-80.72672522	
4,900.00	18.97	354.051	4,881.26	214.61	-22.36	14,447,573.49	1,717,186.97	39.78228557	-80.72673627	
5,000.00	20.97	354.051	4,975.24	248.58	-25.90	14,447,607.46	1,717,183.43	39.78237889	-80.72674850	
5,023.10	21.43	354.051	4,996.78	256.89	-26.77	14,447,615.77	1,717,182.57	39.78240171	-80.72675149	
Begin 21.43° tangent										
5,100.00	21.43	354.051	5,068.36	284.84	-29.68	14,447,643.72	1,717,179.65	39.78247849	-80.72676155	
5,200.00	21.43	354.051	5,161.45	321.18	-33.47	14,447,680.06	1,717,175.87	39.78257832	-80.72677484	
5,300.00	21.43	354.051	5,254.53	357.52	-37.25	14,447,716.40	1,717,172.08	39.78267818	-80.72678772	
5,317.38	21.43	354.051	5,270.71	363.84	-37.91	14,447,722.72	1,717,171.42	39.78269551	-80.72679000	
Begin 8°/100' build/turn										
5,400.00	15.66	4.289	5,349.03	390.00	-38.64	14,447,748.88	1,717,170.69	39.78276736	-80.72679232	
5,500.00	10.09	30.921	5,446.56	411.00	-33.12	14,447,769.88	1,717,176.21	39.78282500	-80.72677244	
5,600.00	9.24	79.768	5,545.29	419.96	-20.70	14,447,778.84	1,717,188.64	39.78284949	-80.72672811	
5,700.00	14.01	112.796	5,643.32	416.69	-1.61	14,447,775.57	1,717,207.73	39.78284035	-80.72666019	
5,800.00	20.83	127.053	5,738.72	401.26	23.78	14,447,760.14	1,717,233.11	39.78279778	-80.72657001	
5,900.00	28.26	134.285	5,829.64	373.98	54.96	14,447,732.86	1,717,264.30	39.78272259	-80.72645930	
6,000.00	35.92	138.662	5,914.32	335.37	91.34	14,447,694.25	1,717,300.67	39.78261624	-80.72833024	
6,100.00	43.68	141.660	5,991.09	286.16	132.20	14,447,645.06	1,717,341.54	39.78248082	-80.72818533	
6,180.73	50.00	143.515	6,046.29	239.40	167.92	14,447,598.28	1,717,377.26	39.78235205	-80.72605870	
Begin 10°/100' build/turn										
6,200.00	51.90	143.962	6,058.43	227.34	176.77	14,447,586.22	1,717,366.10	39.78231884	-80.72602733	
6,300.00	61.75	145.971	6,113.08	158.84	224.69	14,447,517.72	1,717,434.02	39.78213034	-80.72585752	
6,400.00	71.64	147.636	6,152.60	82.06	274.86	14,447,440.94	1,717,484.20	39.78191908	-80.72567975	
6,500.00	81.53	149.119	6,175.77	-0.67	325.78	14,447,358.21	1,717,535.11	39.78169142	-80.72549942	
6,575.46	89.00	150.183	6,182.00	-65.53	363.75	14,447,293.36	1,717,573.08	39.78151300	-80.72536499	
Begin 89.00° lateral										
6,600.00	89.00	150.183	6,182.42	-86.81	375.95	14,447,272.07	1,717,585.28	39.78145443	-80.72532180	
6,700.00	89.00	150.183	6,184.16	-173.56	425.66	14,447,185.32	1,717,635.00	39.78121578	-80.72514579	
6,800.00	89.00	150.183	6,185.90	-260.31	475.38	14,447,098.57	1,717,684.71	39.78097713	-80.72496978	
6,900.00	89.00	150.183	6,187.64	-347.06	525.09	14,447,011.82	1,717,734.43	39.78073847	-80.72479377	
7,000.00	89.00	150.183	6,189.38	-433.81	574.81	14,446,925.07	1,717,784.14	39.78049982	-80.72461777	
7,100.00	89.00	150.183	6,191.12	-520.56	624.52	14,446,838.32	1,717,833.86	39.78026116	-80.72444176	
7,200.00	89.00	150.183	6,192.86	-607.30	674.24	14,446,751.58	1,717,883.57	39.78002251	-80.72426576	
7,300.00	89.00	150.183	6,194.60	-694.05	723.95	14,446,664.83	1,717,933.29	39.77978385	-80.72408975	
7,400.00	89.00	150.183	6,196.34	-780.80	773.67	14,446,578.08	1,717,983.00	39.77954520	-80.72391375	
7,500.00	89.00	150.183	6,198.08	-867.55	823.39	14,446,491.33	1,718,032.72	39.77930654	-80.72373775	
7,600.00	89.00	150.183	6,199.82	-954.30	873.10	14,446,404.58	1,718,082.43	39.77906788	-80.72356175	
7,700.00	89.00	150.183	6,201.56	-1,041.05	922.82	14,446,317.83	1,718,132.15	39.77882923	-80.72338576	
7,800.00	89.00	150.183	6,203.30	-1,127.80	972.53	14,446,231.08	1,718,181.87	39.77859057	-80.72320976	
7,900.00	89.00	150.183	6,205.03	-1,214.55	1,022.25	14,446,144.34	1,718,231.58	39.77835192	-80.72303376	
8,000.00	89.00	150.183	6,206.77	-1,301.29	1,071.96	14,446,057.59	1,718,281.30	39.77811326	-80.72285777	
8,100.00	89.00	150.183	6,208.51	-1,388.04	1,121.68	14,445,970.84	1,718,331.01	39.77787460	-80.72268178	
8,200.00	89.00	150.183	6,210.25	-1,474.79	1,171.39	14,445,884.09	1,718,380.73	39.77763594	-80.72250578	
8,300.00	89.00	150.183	6,211.99	-1,561.54	1,221.11	14,445,797.34	1,718,430.44	39.77739729	-80.72232979	
8,400.00	89.00	150.183	6,213.73	-1,648.29	1,270.82	14,445,710.59	1,718,480.16	39.77715863	-80.72215380	
8,500.00	89.00	150.183	6,215.47	-1,735.04	1,320.54	14,445,623.84	1,718,529.87	39.77691997	-80.72197782	
8,600.00	89.00	150.183	6,217.21	-1,821.79	1,370.26	14,445,537.10	1,718,579.59	39.77668131	-80.72180183	
8,700.00	89.00	150.183	6,218.95	-1,908.54	1,419.97	14,445,450.35	1,718,629.30	39.77644265	-80.72162584	
8,800.00	89.00	150.183	6,220.69	-1,995.28	1,469.69	14,445,363.60	1,718,679.02	39.77620399	-80.72144986	
8,900.00	89.00	150.183	6,222.43	-2,082.03	1,519.40	14,445,276.85	1,718,728.73	39.77596533	-80.72127388	
9,000.00	89.00	150.183	6,224.17	-2,168.78	1,569.12	14,445,190.10	1,718,778.45	39.77572667	-80.72109789	
9,100.00	89.00	150.183	6,225.91	-2,255.53	1,618.83	14,445,103.35	1,718,828.17	39.77548801	-80.72092191	

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 Office of Oil and Gas
 JUN 14 2020
 WV Department of Environmental Protection



Planning Report - Geographic



Database: DB_Aug1919_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Van Winkle
 Well: Van Winkle S-13 HM (slot N)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Van Winkle S-13 HM (slot N)
 TVD Reference: GL @ 754.00ft
 MD Reference: GL @ 754.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (ustft)	Latitude	Longitude
9,200.00	89.00	150.183	6,227.65	-2,342.28	1,668.55	14,445,016.60	1,718,877.88	39.77524935	-80.72074593
9,300.00	89.00	150.183	6,229.39	-2,429.03	1,718.26	14,444,929.86	1,718,927.60	39.77501069	-80.72056996
9,400.00	89.00	150.183	6,231.13	-2,515.78	1,767.99	14,444,843.11	1,718,977.31	39.77477203	-80.72039398
9,500.00	89.00	150.183	6,232.86	-2,602.53	1,817.69	14,444,756.36	1,719,027.03	39.77453337	-80.72021800
9,600.00	89.00	150.183	6,234.60	-2,689.27	1,867.41	14,444,669.61	1,719,076.74	39.77429471	-80.72004203
9,700.00	89.00	150.183	6,236.34	-2,776.02	1,917.13	14,444,582.86	1,719,126.46	39.77405605	-80.71986605
9,800.00	89.00	150.183	6,238.08	-2,862.77	1,966.84	14,444,496.11	1,719,176.17	39.77381738	-80.71969006
9,900.00	89.00	150.183	6,239.82	-2,949.52	2,016.56	14,444,409.36	1,719,225.89	39.77357872	-80.71951411
10,000.00	89.00	150.183	6,241.56	-3,036.27	2,066.27	14,444,322.62	1,719,275.60	39.77334006	-80.71933814
10,100.00	89.00	150.183	6,243.30	-3,123.02	2,115.99	14,444,235.87	1,719,325.32	39.77310140	-80.71916217
10,200.00	89.00	150.183	6,245.04	-3,209.77	2,165.70	14,444,149.12	1,719,375.03	39.77286273	-80.71898620
10,300.00	89.00	150.183	6,246.78	-3,296.52	2,215.42	14,444,062.37	1,719,424.75	39.77262407	-80.71881024
10,400.00	89.00	150.183	6,248.52	-3,383.26	2,265.13	14,443,975.62	1,719,474.47	39.77238541	-80.71863427
10,500.00	89.00	150.183	6,250.26	-3,470.01	2,314.85	14,443,888.87	1,719,524.18	39.77214674	-80.71845831
10,600.00	89.00	150.183	6,252.00	-3,556.76	2,364.57	14,443,802.12	1,719,573.90	39.77190808	-80.71828235
10,700.00	89.00	150.183	6,253.74	-3,643.51	2,414.28	14,443,715.38	1,719,623.61	39.77166941	-80.71810638
10,800.00	89.00	150.183	6,255.48	-3,730.26	2,464.00	14,443,628.63	1,719,673.33	39.77143075	-80.71793042
10,900.00	89.00	150.183	6,257.22	-3,817.01	2,513.71	14,443,541.88	1,719,723.04	39.77119208	-80.71775447
11,000.00	89.00	150.183	6,258.95	-3,903.76	2,563.43	14,443,455.13	1,719,772.76	39.77095342	-80.71757851
11,100.00	89.00	150.183	6,260.69	-3,990.51	2,613.14	14,443,368.38	1,719,822.47	39.77071475	-80.71740255
11,200.00	89.00	150.183	6,262.43	-4,077.26	2,662.86	14,443,281.63	1,719,872.19	39.77047609	-80.71722660
11,300.00	89.00	150.183	6,264.17	-4,164.00	2,712.57	14,443,194.88	1,719,921.90	39.77023742	-80.71705064
11,400.00	89.00	150.183	6,265.91	-4,250.75	2,762.29	14,443,108.14	1,719,971.62	39.76999875	-80.71687469
11,500.00	89.00	150.183	6,267.65	-4,337.50	2,812.00	14,443,021.39	1,720,021.33	39.76976009	-80.71669874
11,600.00	89.00	150.183	6,269.39	-4,424.25	2,861.72	14,442,934.64	1,720,071.05	39.76952142	-80.71652279
11,700.00	89.00	150.183	6,271.13	-4,511.00	2,911.44	14,442,847.89	1,720,120.77	39.76928275	-80.71634684
11,800.00	89.00	150.183	6,272.87	-4,597.75	2,961.15	14,442,761.14	1,720,170.48	39.76904409	-80.71617089
11,900.00	89.00	150.183	6,274.61	-4,684.50	3,010.87	14,442,674.39	1,720,220.20	39.76880542	-80.71599494
12,000.00	89.00	150.183	6,276.35	-4,771.25	3,060.58	14,442,587.64	1,720,269.91	39.76856675	-80.71581900
12,100.00	89.00	150.183	6,278.09	-4,857.99	3,110.30	14,442,500.90	1,720,319.63	39.76832808	-80.71564305
12,200.00	89.00	150.183	6,279.83	-4,944.74	3,160.01	14,442,414.15	1,720,369.34	39.76808941	-80.71546711
12,300.00	89.00	150.183	6,281.57	-5,031.49	3,209.73	14,442,327.40	1,720,419.06	39.76785074	-80.71529117
12,400.00	89.00	150.183	6,283.31	-5,118.24	3,259.44	14,442,240.65	1,720,468.77	39.76761207	-80.71511523
12,500.00	89.00	150.183	6,285.05	-5,204.99	3,309.16	14,442,153.90	1,720,518.49	39.76737341	-80.71493929
12,600.00	89.00	150.183	6,286.78	-5,291.74	3,358.87	14,442,067.15	1,720,568.20	39.76713474	-80.71476335
12,700.00	89.00	150.183	6,288.52	-5,378.49	3,408.59	14,441,980.40	1,720,617.92	39.76689607	-80.71458741
12,800.00	89.00	150.183	6,290.26	-5,465.24	3,458.31	14,441,893.65	1,720,667.63	39.76665740	-80.71441147
12,900.00	89.00	150.183	6,292.00	-5,551.99	3,508.02	14,441,806.91	1,720,717.35	39.76641872	-80.71423554
13,000.00	89.00	150.183	6,293.74	-5,638.73	3,557.74	14,441,720.16	1,720,767.07	39.76618005	-80.71405961
13,100.00	89.00	150.183	6,295.48	-5,725.48	3,607.45	14,441,633.41	1,720,816.78	39.76594138	-80.71388367
13,200.00	89.00	150.183	6,297.22	-5,812.23	3,657.17	14,441,546.66	1,720,866.50	39.76570271	-80.71370774
13,300.00	89.00	150.183	6,298.96	-5,898.98	3,706.88	14,441,459.91	1,720,916.21	39.76546404	-80.71353181
13,400.00	89.00	150.183	6,300.70	-5,985.73	3,756.60	14,441,373.16	1,720,965.93	39.76522537	-80.71335588
13,500.00	89.00	150.183	6,302.44	-6,072.48	3,806.31	14,441,286.42	1,721,015.64	39.76498670	-80.71317996
13,600.00	89.00	150.183	6,304.18	-6,159.23	3,856.03	14,441,199.67	1,721,065.36	39.76474802	-80.71300403
13,700.00	89.00	150.183	6,305.92	-6,245.97	3,905.74	14,441,112.92	1,721,115.07	39.76450935	-80.71282810
13,800.00	89.00	150.183	6,307.66	-6,332.72	3,955.46	14,441,026.17	1,721,164.79	39.76427068	-80.71265218
13,900.00	89.00	150.183	6,309.40	-6,419.47	4,005.18	14,440,939.42	1,721,214.50	39.76403201	-80.71247626
14,000.00	89.00	150.183	6,311.14	-6,506.22	4,054.89	14,440,852.67	1,721,264.22	39.76379333	-80.71230034
14,100.00	89.00	150.183	6,312.88	-6,592.97	4,104.61	14,440,765.92	1,721,313.93	39.76355466	-80.71212442
14,200.00	89.00	150.183	6,314.61	-6,679.72	4,154.32	14,440,679.18	1,721,363.65	39.76331599	-80.71194850
14,300.00	89.00	150.183	6,316.35	-6,766.47	4,204.04	14,440,592.43	1,721,413.37	39.76307731	-80.71177258
14,400.00	89.00	150.183	6,318.09	-6,853.22	4,253.75	14,440,505.68	1,721,463.08	39.76283863	-80.71159666
14,500.00	89.00	150.183	6,319.83	-6,939.96	4,303.47	14,440,418.93	1,721,512.80	39.76259996	-80.71142075
14,600.00	89.00	150.183	6,321.57	-7,026.71	4,353.18	14,440,332.18	1,721,562.51	39.76236129	-80.71124483

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 WV Department of Environmental Protection



Planning Report - Geographic



Database: DB_Aug1919_V14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Van Winkle
 Well: Van Winkle S-13 HM (slot N)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Van Winkle S-13 HM (slot N)
 TVD Reference: GL @ 754.00ft
 MD Reference: GL @ 754.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,700.00	89.00	150.183	6,323.31	-7,113.46	4,402.90	14,440,245.43	1,721,612.23	39.76212261	-80.71106892
14,800.00	89.00	150.183	6,325.05	-7,200.21	4,452.62	14,440,156.68	1,721,661.94	39.76188393	-80.71089301
14,900.00	89.00	150.183	6,326.79	-7,286.96	4,502.33	14,440,071.94	1,721,711.66	39.76164526	-80.71071710
15,000.00	89.00	150.183	6,328.53	-7,373.71	4,552.05	14,439,985.19	1,721,761.37	39.76140658	-80.71054119
15,100.00	89.00	150.183	6,330.27	-7,460.46	4,601.76	14,439,898.44	1,721,811.09	39.76116791	-80.71036528
15,200.00	89.00	150.183	6,332.01	-7,547.21	4,651.48	14,439,811.69	1,721,860.80	39.76092923	-80.71018937
15,300.00	89.00	150.183	6,333.75	-7,633.95	4,701.19	14,439,724.94	1,721,910.52	39.76069055	-80.71001347
15,400.00	89.00	150.183	6,335.49	-7,720.70	4,750.91	14,439,638.19	1,721,960.23	39.76045187	-80.70983756
15,500.00	89.00	150.183	6,337.23	-7,807.45	4,800.62	14,439,551.44	1,722,009.95	39.76021320	-80.70966165
15,600.00	89.00	150.183	6,338.97	-7,894.20	4,850.34	14,439,464.70	1,722,059.67	39.75997452	-80.70948576
15,700.00	89.00	150.183	6,340.70	-7,980.95	4,900.05	14,439,377.95	1,722,109.38	39.75973584	-80.70930985
15,800.00	89.00	150.183	6,342.44	-8,067.70	4,949.77	14,439,291.20	1,722,159.10	39.75949716	-80.70913395
15,900.00	89.00	150.183	6,344.18	-8,154.45	4,999.49	14,439,204.45	1,722,208.81	39.75925848	-80.70895805
16,000.00	89.00	150.183	6,345.92	-8,241.20	5,049.20	14,439,117.70	1,722,258.53	39.75901980	-80.70878216
16,100.00	89.00	150.183	6,347.66	-8,327.94	5,098.92	14,439,030.95	1,722,308.24	39.75878113	-80.70860627
16,200.00	89.00	150.183	6,349.40	-8,414.69	5,148.63	14,438,944.20	1,722,357.96	39.75854245	-80.70843037
16,300.00	89.00	150.183	6,351.14	-8,501.44	5,198.35	14,438,857.46	1,722,407.67	39.75830377	-80.70825448
16,400.00	89.00	150.183	6,352.88	-8,588.19	5,248.06	14,438,770.71	1,722,457.39	39.75806509	-80.70807859
16,500.00	89.00	150.183	6,354.62	-8,674.94	5,297.78	14,438,683.96	1,722,507.10	39.75782641	-80.70790269
16,600.00	89.00	150.183	6,356.36	-8,761.69	5,347.49	14,438,597.21	1,722,556.82	39.75758773	-80.70772680
16,700.00	89.00	150.183	6,358.10	-8,848.44	5,397.21	14,438,510.46	1,722,606.53	39.75734904	-80.70755092
16,800.00	89.00	150.183	6,359.84	-8,935.19	5,446.92	14,438,423.71	1,722,656.25	39.75711036	-80.70737503
16,900.00	89.00	150.183	6,361.58	-9,021.93	5,496.64	14,438,336.96	1,722,705.97	39.75687168	-80.70719914
17,000.00	89.00	150.183	6,363.32	-9,108.68	5,546.36	14,438,250.22	1,722,755.68	39.75663300	-80.70702326
17,100.00	89.00	150.183	6,365.06	-9,195.43	5,596.07	14,438,163.47	1,722,805.40	39.75639432	-80.70684737
17,200.00	89.00	150.183	6,366.80	-9,282.18	5,645.79	14,438,076.72	1,722,855.11	39.75615564	-80.70667149
17,300.00	89.00	150.183	6,368.53	-9,368.93	5,695.50	14,437,989.97	1,722,904.83	39.75591695	-80.70649561
17,400.00	89.00	150.183	6,370.27	-9,455.68	5,745.22	14,437,903.22	1,722,954.54	39.75567827	-80.70631973
17,500.00	89.00	150.183	6,372.01	-9,542.43	5,794.93	14,437,816.47	1,723,004.26	39.75543959	-80.70614385
17,600.00	89.00	150.183	6,373.75	-9,629.18	5,844.65	14,437,729.72	1,723,053.97	39.75520091	-80.70596797
17,700.00	89.00	150.183	6,375.49	-9,715.92	5,894.36	14,437,642.98	1,723,103.69	39.75496222	-80.70579209
17,800.00	89.00	150.183	6,377.23	-9,802.67	5,944.08	14,437,556.23	1,723,153.40	39.75472354	-80.70561622
17,900.00	89.00	150.183	6,378.97	-9,889.42	5,993.80	14,437,469.48	1,723,203.12	39.75448485	-80.70544034
18,000.00	89.00	150.183	6,380.71	-9,976.17	6,043.51	14,437,382.73	1,723,252.83	39.75424617	-80.70526447
18,100.00	89.00	150.183	6,382.45	-10,062.92	6,093.23	14,437,295.98	1,723,302.55	39.75400748	-80.70508860
18,200.00	89.00	150.183	6,384.19	-10,149.67	6,142.94	14,437,209.23	1,723,352.26	39.75376880	-80.70491273
18,300.00	89.00	150.183	6,385.93	-10,236.42	6,192.66	14,437,122.48	1,723,401.98	39.75353011	-80.70473685
18,400.00	89.00	150.183	6,387.67	-10,323.17	6,242.37	14,437,035.74	1,723,451.70	39.75329143	-80.70456099
18,500.00	89.00	150.183	6,389.41	-10,409.91	6,292.09	14,436,948.99	1,723,501.41	39.75305274	-80.70438512
18,600.00	89.00	150.183	6,391.15	-10,496.66	6,341.80	14,436,862.24	1,723,551.13	39.75281406	-80.70420926
18,700.00	89.00	150.183	6,392.89	-10,583.41	6,391.52	14,436,775.49	1,723,600.84	39.75257537	-80.70403339
18,800.00	89.00	150.183	6,394.63	-10,670.16	6,441.23	14,436,688.74	1,723,650.56	39.75233669	-80.70385753
18,900.00	89.00	150.183	6,396.36	-10,756.91	6,490.95	14,436,601.99	1,723,700.27	39.75209800	-80.70368167
19,000.00	89.00	150.183	6,398.10	-10,843.66	6,540.67	14,436,515.24	1,723,749.99	39.75185931	-80.70350581
19,100.00	89.00	150.183	6,399.84	-10,930.41	6,590.38	14,436,428.50	1,723,799.70	39.75162062	-80.70332995
19,200.00	89.00	150.183	6,401.58	-11,017.16	6,640.10	14,436,341.75	1,723,849.42	39.75138194	-80.70315409
19,300.00	89.00	150.183	6,403.32	-11,103.90	6,689.81	14,436,255.00	1,723,899.13	39.75114325	-80.70297823
19,400.00	89.00	150.183	6,405.06	-11,190.65	6,739.53	14,436,168.25	1,723,948.85	39.75090456	-80.70280238
19,500.00	89.00	150.183	6,406.80	-11,277.40	6,789.24	14,436,081.50	1,723,998.56	39.75066587	-80.70262652
19,600.00	89.00	150.183	6,408.54	-11,364.15	6,838.96	14,435,994.75	1,724,048.28	39.75042718	-80.70245067
19,700.00	89.00	150.183	6,410.28	-11,450.90	6,888.67	14,435,908.00	1,724,098.00	39.75018849	-80.70227482
19,800.00	89.00	150.183	6,412.02	-11,537.65	6,938.39	14,435,821.25	1,724,147.71	39.74994980	-80.70209896
19,900.00	89.00	150.183	6,413.76	-11,624.40	6,988.10	14,435,734.51	1,724,197.43	39.74971112	-80.70192311
20,000.00	89.00	150.183	6,415.50	-11,711.15	7,037.82	14,435,647.76	1,724,247.14	39.74947243	-80.70174727
20,100.00	89.00	150.183	6,417.24	-11,797.89	7,087.54	14,435,561.01	1,724,296.86	39.74923374	-80.70157142

Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Van Winkle S-13 HM (slot N)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 754.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 754.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle S-13 HM (slot N)	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	
20,200.00	89.00	150.183	6,418.98	-11,884.64	7,137.25	14,435,474.26	1,724,346.57	39.74899505	-80.70139557	
20,300.00	89.00	150.183	6,420.72	-11,971.39	7,186.97	14,435,387.51	1,724,396.29	39.74875635	-80.70121973	
20,400.00	89.00	150.183	6,422.45	-12,058.14	7,236.68	14,435,300.76	1,724,446.00	39.74851766	-80.70104388	
20,500.00	89.00	150.183	6,424.19	-12,144.89	7,286.40	14,435,214.02	1,724,495.72	39.74827897	-80.70086804	
20,600.00	89.00	150.183	6,425.93	-12,231.64	7,336.11	14,435,127.27	1,724,545.43	39.74804028	-80.70069220	
20,700.00	89.00	150.183	6,427.67	-12,318.39	7,385.83	14,435,040.52	1,724,595.15	39.74780159	-80.70051636	
20,800.00	89.00	150.183	6,429.41	-12,405.14	7,435.54	14,434,953.77	1,724,644.86	39.74758290	-80.70034052	
20,891.29	89.00	150.183	6,431.00	-12,484.33	7,480.93	14,434,874.58	1,724,690.25	39.74734500	-80.70018000	
PBHL/TD 20891.29 MD/6431.00 TVD										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Van Winkle S-13HM LP - hit/miss target - Shape - Point	0.00	0.000	6,182.00	-65.52	363.74	14,447,293.36	1,717,573.08	39.78151300	-80.72536500	
Van Winkle S-13HM PBI - plan hits target center - Point	0.00	0.000	6,431.00	-12,484.33	7,480.93	14,434,874.58	1,724,690.25	39.74734500	-80.70018000	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment	
1,500.00	1,500.00	0.00	0.00	KOP Begin 2°/100' build	
1,650.00	1,649.93	3.90	-0.41	Begin 3.00° tangent	
2,650.00	2,648.56	55.96	-5.83	Begin 2°/100' drop	
2,800.00	2,798.49	59.86	-6.24	Begin vertical hold	
3,951.51	3,950.00	59.86	-6.24	Begin 2°/100' build	
5,023.10	4,996.78	256.89	-26.77	Begin 21.43° tangent	
5,317.38	5,270.71	363.84	-37.91	Begin 8°/100' build/turn	
6,180.73	6,046.29	239.40	167.92	Begin 10°/100' build/turn	
6,575.46	6,182.00	-65.53	363.75	Begin 89.00° lateral	
20,891.29	6,431.00	-12,484.33	7,480.93	PBHL/TD 20891.29 MD/6431.00 TVD	

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JUN 14 2021

WV Department of
Environmental Protection

**HUNTER PETHTEL LEASE
VAN WINKLE S 13HM WELL
TUG HILL OPERATING**

T.H. LATITUDE 39°47'30"
B.H. LATITUDE 39°45'00"

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

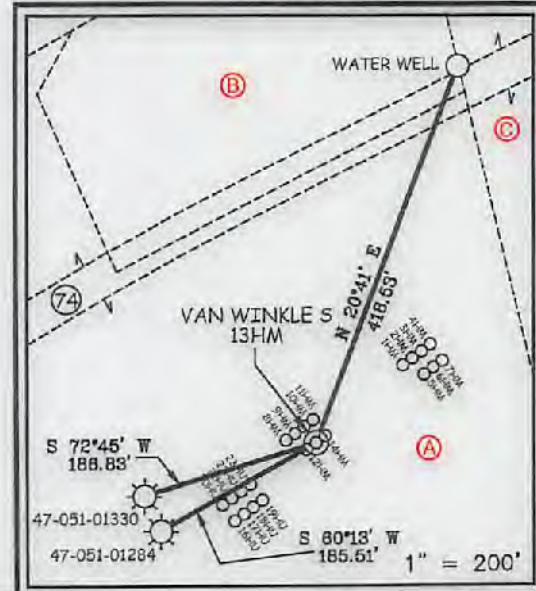
NAD'83 S.P.C.(FT)	N. 469,187.15	E. 1,623,773.44
NAD'83 GEO.	LAT-(N) 39.781698	LONG-(W) 80.726659
NAD'83 UTM (M)	N. 4,403,563.84	E. 523,406.43
LANDING POINT		
NAD'83 S.P.C.(FT)	N. 469,115.4	E. 1,624,136.2
NAD'83 GEO.	LAT-(N) 39.781513	LONG-(W) 80.725865
NAD'83 UTM (M)	N. 4,403,543.8	E. 523,517.3
BOTTOM HOLE		
NAD'83 S.P.C.(FT)	N. 466,575.2	E. 1,631,047.3
NAD'83 GEO.	LAT-(N) 39.747345	LONG-(W) 80.700180
NAD'83 UTM (M)	N. 4,399,758.6	E. 525,686.6

T.H. LONGITUDE 80°42'30"
B.H. LONGITUDE 80°40'00"
3,632' T.H. 968' B.H.



PARCEL	SURFACE ADJOINER	ACRES
9-13-5.1	MICHAEL WALKER & JOSEPH BLAKE	3.26
9-13-16.1	IVAN H. & MARGARET A. RICHMOND	1.518
9-13-22.1	HENRY JR. & BARBARA DICK	11.82
9-13-22.2	EUGENE A. SCHERRER	0.925
9-13-23	MARGARET FOX (LIFE)	1.52
9-16-6	ROBERT M. & NANCY R. MCCARDLE	31.00
9-16-7	WILLIAM B. KLUG, ET UX	26.105
9-16-10	IVAN H. & MARGARET A. RICHMOND	1.518
9-16-12.1	JAMES G. RICHMOND, ET UX	0.691
9-16-12.2	SPENCER J. & CARRIE A. RICHMOND	0.575
9-16-12.3	JAMES G. RICHMOND, ET UX	0.937
9-16-12.4	SHEILA TRUAX, ET VIR	0.516
9-16-12.5	TIMOTHY S. & GRETCHEN M. KIDD	1.23
9-16-12.6	SPENCY J. & CARRIE A. RICHMOND	0.141
9-16-12.7	SPENCY J. & CARRIE A. RICHMOND	0.55
9-16-12.8	IVAN H. & MARGARET A. RICHMOND	0.85
9-16-13.1	PAUL W. BLAKE (LIFE), WESLEY D. YEATER, JR., ET AL.	0.91
9-16-13.2	ELEANOR M. FOX EST.	1.570
9-16-13.3	PAUL R. BLAKE	0.7538
9-16-13.4	JOHN FOX	0.533
9-16-13.5	PAUL R. BLAKE & PAUL R. BLAKE II	2.921
9-16-13.6	WESLEY D. YEATER, ET UX	2.144
9-16-16	CLINTON B. WHITELATCH, SR., ET UX, ESTS.	1 AC 5.6 P
9-16-17	ELEANOR M. FOX EST.	0.741
9-16-18.1	ROBIN D. & DAVID G. STEWART	3.333

REFERENCES



NOTES ON SURVEY

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
- BASED ON WV DOT COUNTY ROUTE 74 IS A 40' STRIP OF LAND ACQUIRED IN NUMEROUS DEEDS.



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26031 | 304.462.5514
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952
234 East Beckley Bypass | Beckley, WV 25801 | 304.253.5296
slsvw.com



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

P.S. 849 *C. Victor Moyers*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE JANUARY 19, 20 21
REVISED APRIL 26, 2021
OPERATORS WELL NO. VAN WINKLE S 13HM
API WELL NO. 47 - 051 - 02362
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8952P13HMR.dwg
VAN WINKLE S 13HM-REV1
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)
SCALE 1" = 2000'

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

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

LOCATION: GROUND: 756.00' ELEVATION PROPOSED: 753.50' WATERSHED FISH CREEK (HUC 10)
DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER XCL MIDSTREAM OPERATING, LLC ACREAGE 190.12 ±
ROYALTY OWNER DENNIS HUNTER, ET AL - SEE WW-6A1 ACREAGE 190.12 ±

PROPOSED WORK:
DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

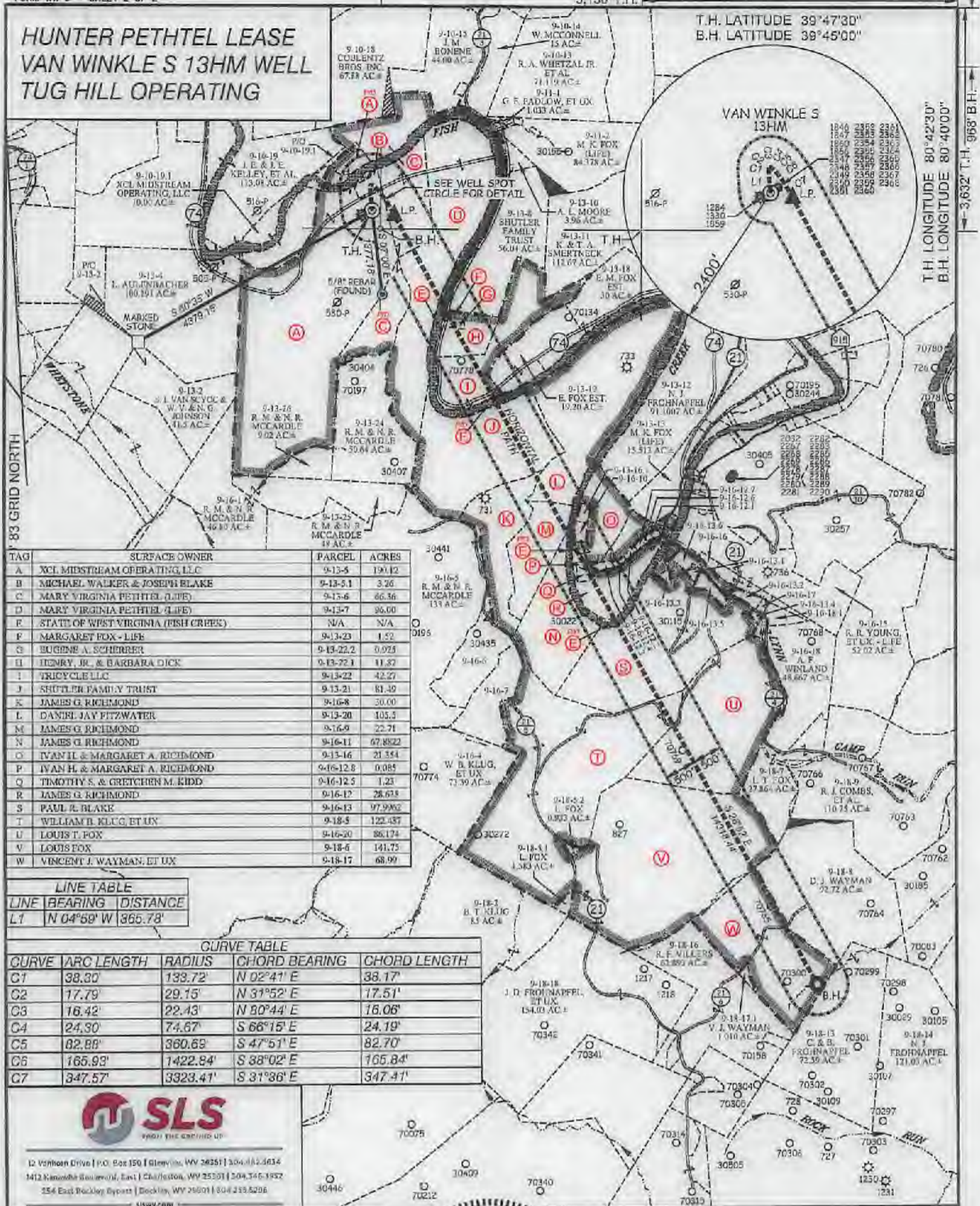
PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6,297' / TMD: 20,891'

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

COUNTY NAME PERMIT

07/16/2021

**HUNTER PETHTEL LEASE
VAN WINKLE S 13HM WELL
TUG HILL OPERATING**



TAG	SURFACE OWNER	PARCEL	ACRES
A	XCL MIDSTREAM OPERATING, LLC	9-13-5	190.42
B	MICHAEL WALKER & JOSEPH BLAKE	9-13-5-1	3.26
C	MARY VIRGINIA PETHTEL (LIFE)	9-13-6	66.56
D	MARY VIRGINIA PETHTEL (LIFE)	9-13-7	96.00
E	STATE OF WEST VIRGINIA (FISH CREEK)	N/A	N/A
F	MARGARET FOX - LIFE	9-13-23	1.52
G	BUGINE A. SCHERRER	9-13-22.2	0.923
H	HENRY, JR., & BARBARA DICK	9-13-22.1	11.82
I	TRICYCLE LLC	9-13-22	42.27
J	SHUTLER FAMILY TRUST	9-13-21	81.30
K	JAMES G. RICHMOND	9-16-8	30.00
L	DANIEL JAY FITZWATER	9-13-20	105.5
M	JAMES G. RICHMOND	9-16-9	22.71
N	JAMES G. RICHMOND	9-16-11	67.8922
O	IVAN H. & MARGARET A. RICHMOND	9-13-16	21.554
P	IVAN H. & MARGARET A. RICHMOND	9-16-12.8	0.085
Q	TIMOTHY S. & GRETCHEN M. KIDD	9-16-12.5	1.23
R	JAMES G. RICHMOND	9-16-12	28.673
S	PAUL R. BLAKE	9-16-13	97.9962
T	WILLIAM B. KLUG, ET UX	9-18-5	122.437
U	LOUIS T. FOX	9-16-20	86.174
V	LOUIS FOX	9-18-6	141.75
W	VINCENT J. WAYMAN, ET UX	9-18-17	68.99

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 04°59' W	365.73'

CURVE TABLE				
CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	38.30'	139.72'	N 02°41' E	38.17'
C2	17.79'	29.15'	N 31°52' E	17.51'
C3	16.42'	22.43'	N 80°44' E	16.06'
C4	24.30'	74.67'	S 66°15' E	24.19'
C5	82.88'	360.69'	S 47°51' E	82.70'
C6	165.93'	1422.84'	S 38°02' E	165.84'
C7	347.57'	3323.41'	S 31°36' E	347.41'



D. Voshon Drive | P.O. Box 150 | Glenview, WV 26031 | 304.482.3634
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.1952
354 East Beckley Bypass | Beckley, WV 26001 | 304.239.5296
slsww.com



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

P.S. 849 *C. Victor Moyers*

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- TAX MAP-PARCEL
- SURFACE OWNER (SEE TABLE)
- LEASE # (SEE WW-8A1)

SCALE 1" = 2000' FILE NO 8552P13HMR.dwg
VAN WINKLE S 13HM-REV1
DATE JANUARY 19, 20 21
REVISED APRIL 26, 2021
OPERATORS WELL NO. VAN WINKLE S 13HM
API WELL NO. 47-051-02362
NO. STATE COUNTY PERMIT

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



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

COUNTY NAME PERMIT

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

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

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

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
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*See attached pages

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

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

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

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. Morris *Amy L. Morris* RECEIVED
Office of Oil and Gas
Its: Permitting Specialist - Appalachia Region

JUN 14 2021

07/16/2021

Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*31312	9-13-5	A	DENNIS W HUNTER AND KATHY A HUNTER	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	668	155	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31312	9-13-5.1	B	DENNIS W HUNTER AND KATHY A HUNTER	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	668	155	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31303	9-13-6	C	MARY V PETHTEL AND FRANK E PETHTEL	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	668	525	N/A	N/A	N/A	N/A	N/A	N/A	Central Michigan Exploration LLC to Stone Energy Corp.: 21/288 & 21/356	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31304	9-13-6	C	MARY V PETHTEL AND FRANK E PETHTEL	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	672	171	N/A	N/A	N/A	N/A	N/A	N/A	Central Michigan Exploration LLC to Stone Energy Corp.: 21/288 & 21/356	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31306	9-13-6	C	RICHARD CUNNINGHAM	STONE ENERGY CORPORATION	1/8+	859	595	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31307	9-13-6	C	LINDA DANLEY	STONE ENERGY CORPORATION	1/8+	859	593	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31308	9-13-6	C	SUZY WALKER	STONE ENERGY CORPORATION	1/8+	859	591	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31303	9-13-7	D	MARY V PETHTEL AND FRANK E PETHTEL	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	668	525	N/A	N/A	N/A	N/A	N/A	N/A	Central Michigan Exploration LLC to Stone Energy Corp.: 21/288 & 21/356	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31304	9-13-7	D	MARY V PETHTEL AND FRANK E PETHTEL	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	672	171	N/A	N/A	N/A	N/A	N/A	N/A	Central Michigan Exploration LLC to Stone Energy Corp.: 21/288 & 21/356	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31305	9-13-7	D	MARY V PETHTEL AND FRANK E PETHTEL	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	677	401	N/A	N/A	N/A	N/A	N/A	N/A	Central Michigan Exploration LLC to Stone Energy Corp.: 38/54	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31309	9-13-7	D	RICHARD CUNNINGHAM	STONE ENERGY CORPORATION	1/8+	870	122	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31310	9-13-7	D	SUSAN WALKER	STONE ENERGY CORPORATION	1/8+	870	139	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*31311	9-13-7	D	LINDA DANLEY	STONE ENERGY CORPORATION	1/8+	870	141	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*23458	FISH CREEK	E	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	TH EXPLORATION LLC	1/8+	1019	373	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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WV Department of
Environmental Protection

10*30596	9-13-23	F	THOMAS JOHN FOX	TH EXPLORATION LLC	1/8+	1116	415	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*30595	9-13-23	F	MARK H FOX	TH EXPLORATION LLC	1/8+	1116	413	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*30593	9-13-23	F	PAUL G FOX	TH EXPLORATION LLC	1/8+	1116	408	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*30592	9-13-23	F	LOUIS T FOX	TH EXPLORATION LLC	1/8+	1116	406	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*35094	9-13-23	F	MARY A FOX	TH EXPLORATION LLC	1/8+	1116	404	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*30591	9-13-23	F	DAVID E FOX	TH EXPLORATION LLC	1/8+	1116	410	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*27247	9-13-22.2	G	DANIEL R JOHNSON AND JOANNA L JOHNSON	TH EXPLORATION LLC	1/8+	1053	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27248	9-13-22.2	G	NILA K MOWDER AND THOMAS R MOWDER	TH EXPLORATION LLC	1/8+	1053	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27835	9-13-22.2	G	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1058	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28267	9-13-22.2	G	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1062	266	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28353	9-13-22.2	G	EUGENE A SCHERRER JR	TH EXPLORATION LLC	1/8+	1071	472	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27247	9-13-22.1	H	DANIEL R JOHNSON AND JOANNA L JOHNSON	TH EXPLORATION LLC	1/8+	1053	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27248	9-13-22.1	H	NILA K MOWDER AND THOMAS R MOWDER	TH EXPLORATION LLC	1/8+	1053	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27835	9-13-22.1	H	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1058	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28266	9-13-22.1	H	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1062	264	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28267	9-13-22.1	H	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1062	266	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27247	9-13-22	I	DANIEL R JOHNSON AND JOANNA L JOHNSON	TH EXPLORATION LLC	1/8+	1053	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27248	9-13-22	I	NILA K MOWDER AND THOMAS R MOWDER	TH EXPLORATION LLC	1/8+	1053	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27835	9-13-22	I	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1058	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28267	9-13-22	I	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1062	266	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*29453	9-13-22	I	TRICYCLE LLC	TH EXPLORATION LLC	1/8+	1096	307	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23197	9-13-21	J	J W KELLEY AND R A KELLEY	TG STILES	1/8+	63	156	N/A	N/A	TG Stiles to South Penn Oil Company: 60/367	Hope natural Gas Company to AM Snider & Duane Snyder dba Hundred Gas Company: 446/186	Hundred Gas Company to Carl D Perkins: 451/132	Carl D Perkins to Perkins Oil and Gas Inc: 583/72	Perkins Oil & Gas Inc to Stone Energy Corporation: 26/322	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*23197	9-16-8	K	J W KELLEY AND R A KELLEY	TG STILES	1/8+	63	156	N/A	N/A	TG Stiles to South Penn Oil Company: 60/367	Hope natural Gas Company to AM Snider & Duane Snyder dba Hundred Gas Company: 446/186	Hundred Gas Company to Carl D Perkins: 451/132	Carl D Perkins to Perkins Oil and Gas Inc: 583/72	Perkins Oil & Gas Inc to Stone Energy Corporation: 26/322	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21

10*17193	9-13-20	L	JOHN P. ICARD	CHESAPEAKE APPALACHIA LLC	1/8+	716	12	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325	RECEIVED Office of Natural Gas Titleholder LLC: 35/424	Statoil USA Onshore Properties Inc to SWN Exchange LLC to SWN Production Company LLC: 19/624	Chesapeake Appalachia LLC to SWN Production Co. LLC: 33/110	SWN Production Company LLC to TH Exploration LLC: 41/256	Statoil USA Onshore Properties Inc to TH Exploration LLC: 41/238
10*18351	9-13-20	L	MARK ALLEN LENENBERG	TH EXPLORATION LLC	1/8+	931	399	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18456	9-13-20	L	DANIEL J FITZWATER	TH EXPLORATION LLC	1/8+	933	180	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18469	9-13-20	L	THOMAS RICHMOND YOUNG ANITA A YOUNG	TH EXPLORATION LLC	1/8+	933	151	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18470	9-13-20	L	CHERYL STEFFEN AND GREGORY STEFFEN	TH EXPLORATION LLC	1/8+	933	148	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18471	9-13-20	L	MORGAN C GUMP AND MARY J GUMP	TH EXPLORATION LLC	1/8+	942	210	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18472	9-13-20	L	LEIGH A DURRAH	TH EXPLORATION LLC	1/8+	933	136	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18524	9-13-20	L	DAVID A GUMP AND BETTY J GUMP	TH EXPLORATION LLC	1/8+	933	597	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18527	9-13-20	L	ANN TURNER YOUNG SHRIVER	TH EXPLORATION LLC	1/8+	933	589	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18967	9-13-20	L	NATALIE GIBBS	TH EXPLORATION LLC	1/8+	941	265	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19349	9-13-20	L	MARJOLEA A DEBOLD	TH EXPLORATION LLC	1/8+	932	409	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19516	9-13-20	L	JAMES E NICHOLAS AND BEVERLY D NICHOLAS	TH EXPLORATION LLC	1/8+	944	366	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19883	9-13-20	L	JILL A WILLIAMS AND TERRY L WILLIAMS	TH EXPLORATION LLC	1/8+	948	547	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19885	9-13-20	L	NANCY L RICHMOND AND GREGORY RICHMOND	TH EXPLORATION LLC	1/8+	948	549	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19886	9-13-20	L	MARK A RICHMOND & LISA D RICHMOND	TH EXPLORATION LLC	1/8+	948	543	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19887	9-13-20	L	ELIZABETH S SCOVELL & JONATHAN A SCOVELL	TH EXPLORATION LLC	1/8+	948	545	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19892	9-13-20	L	REX B FISHER AND DEBORAH FISHER	TH EXPLORATION LLC	1/8+	948	292	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21012	9-13-20	L	TIMOTHY R RICHMOND II AND BRANDI N RICHMOND	TH EXPLORATION LLC	1/8+	951	149	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21014	9-13-20	L	JAMES P MCLAUGHLIN & ALICE W MCLAUGHLIN	TH EXPLORATION LLC	1/8+	946	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21015	9-13-20	L	ROBERT L MCLAUGHLIN	TH EXPLORATION LLC	1/8+	946	339	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21485	9-13-20	L	ROBERT R FISHER AND AUDREY L IRVIN	TH EXPLORATION LLC	1/8+	942	572	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21504	9-13-20	L	PAULETA LINDA CHEATHAM AND CARL WOHLERS	TH EXPLORATION LLC	1/8+	951	142	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21598	9-13-20	L	THE MILDRED Y MILLS TRUST JULY 5TH 2007	TH EXPLORATION LLC	1/8+	954	332	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21709	9-13-20	L	THOMAS YOUNG AND JANE CLAIRE YOUNG	TH EXPLORATION LLC	1/8+	959	350	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21710	9-13-20	L	PENELOPE A JONES	TH EXPLORATION LLC	1/8+	959	355	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21867	9-13-20	L	HELEN L BROWN	TH EXPLORATION LLC	1/8+	959	472	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22863	9-13-20	L	JAMES H CAMPBELL	TH EXPLORATION LLC	1/8+	977	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22864	9-13-20	L	MARGARET R DONOFRIO	TH EXPLORATION LLC	1/8+	977	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23164	9-13-20	L	J C RICHMOND AND MARY RICHMOND	TG STILES	1/8+	63	154	TG Stiles to South Penn Oil Company: 60/366	South Penn Oil Company to Tri-State Gas Company: 80/150	Tri-State Gas Company to The Manufacturers Light & Heat Company: 148/388	The Manufacturers Light & Heat Company to AM Snider & Duane M Sniders, Partners dba Hundred Gas Company: 4/489	Hundred Gas Company to Carl D Perkins: 451/132	Carl D Perkins to Perkins Oil and Gas Inc: 583/72	Perkins Oil & Gas Inc to Stone Energy Corporation: 26/322	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*23190	9-13-20	L	NELSON RICHMOND, ETC	TH EXPLORATION LLC	1/8+	979	191	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27947	9-13-20	L	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1063	568	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28158	9-13-20	L	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1068	140	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16481	9-16-9	M	JAMES G RICHMOND AND CINDY L RICHMOND	FOSSIL CREEK OHIO, LLC	1/8+	829	71	N/A	N/A	N/A	N/A	N/A	N/A	Fossil Creek Ohio LLC to Gulfport Energy Corporation: 32/307 & 34/410	Gulfport Energy Corp & Fossil Creek Ohio LLC to American Petroleum Partners Operating LLC: 36/588	American Petroleum Partners Operating LLC to TH Exploration LLC: 42/109
10*16481	9-16-11	N	JAMES G RICHMOND AND CINDY L RICHMOND	FOSSIL CREEK OHIO, LLC	1/8+	829	71	N/A	N/A	N/A	N/A	N/A	N/A	Fossil Creek Ohio LLC to Gulfport Energy Corporation: 32/307 & 34/410	Gulfport Energy Corp & Fossil Creek Ohio LLC to American Petroleum Partners Operating LLC: 36/588	American Petroleum Partners Operating LLC to TH Exploration LLC: 42/109
10*17895	9-13-16	O	IVAN H RICHMOND AND MARGARET A RICHMOND	TH EXPLORATION LLC	1/8+	924	543	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

10*17895	9-16-12.8	P	IVAN H RICHMOND AND MARGARET A RICHMOND	TH EXPLORATION LLC	1/8+	924 938	543 528	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16481	9-16-12.5	Q	JAMES G RICHMOND AND CINDY L RICHMOND	FOSSIL CREEK OHIO, LLC	1/8+	829	71	N/A	N/A	N/A	N/A	N/A	N/A	Fossil Creek Ohio LLC to Gulfport Energy Corporation: 32/307 & 34/410	Gulfport Energy Corp & Fossil Creek Ohio LLC to American Petroleum Partners Operating LLC: 36/588	American Petroleum Partners Operating LLC to TH Exploration LLC: 42/109
10*16481	9-16-12	R	JAMES G RICHMOND AND CINDY L RICHMOND	FOSSIL CREEK OHIO, LLC	1/8+	829	71	N/A	N/A	N/A	N/A	N/A	N/A	Fossil Creek Ohio LLC to Gulfport Energy Corporation: 32/307 & 34/410	Gulfport Energy Corp & Fossil Creek Ohio LLC to American Petroleum Partners Operating LLC: 36/588	American Petroleum Partners Operating LLC to TH Exploration LLC: 42/109
10*47051.135	9-16-13	S	PAUL R BLAKE	TH EXPLORATION LLC	1/8+	878	280	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27947	9-18-5	T	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1063	568	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28268	9-18-5	T	JOSEPH & ELIZABETH SHUTLER	TG STILES	1/8+	63	203	TG Stiles to South Penn Oil Company: 60/366	South Penn Oil Company to Tri-State Gas Company: 80/150	Tri-State Gas Company to The Manufacturers Light & Heat Co: 148/388	The Manufacturers Light & Heat Company to AM Snider & Duane Snider dba Hundred Gas Company: 4/489	Hundred Gas Company to Carl D Perkins: 451/132	Carl D Perkins to Perkins Oil and Gas Inc: 583/72	Perkins Oil & Gas Inc to Stone Energy Corporation: 26/322	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*23726	9-16-20	U	LOUIS T FOX	TH EXPLORATION LLC	1/8+	1011	520	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27395	9-16-20	U	LYNN CAMP UNITED METHODIST CHURCH	TH EXPLORATION LLC	1/8+	1058	376	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*28268	9-18-6	V	JOSEPH & ELIZABETH SHUTLER	TG STILES	1/8+	63	203	TG Stiles to South Penn Oil Company: 60/366	South Penn Oil Company to Tri-State Gas Company: 80/150	Tri-State Gas Company to The Manufacturers Light & Heat Co: 148/388	The Manufacturers Light & Heat Company to AM Snider & Duane Snider dba Hundred Gas Company: 4/489	Hundred Gas Company to Carl D Perkins: 451/132	Carl D Perkins to Perkins Oil and Gas Inc: 583/72	Perkins Oil & Gas Inc to Stone Energy Corporation: 26/322	Stone Energy Corporation to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21
10*47051.136	9-18-17	W	VINCENT J WAYMAN AND KATHY JO WAYMAN	TH EXPLORATION LLC	1/8+	885	273	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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ASSIGNMENT AND BILL OF SALE

This ASSIGNMENT AND BILL OF SALE (this "Assignment") dated as of December 1, 2020 (the "Execution Date"), is made by and between EQT PRODUCTION COMPANY, a Pennsylvania corporation, with an address at 625 Liberty Avenue, Suite 1700, Pittsburgh, Pennsylvania 15222 ("EQT"), and TH EXPLORATION, LLC, a Texas limited liability company, with an address at 1320 S. University Drive, Suite 500, Fort Worth, Texas 76107 ("TH") pursuant to the terms of that certain Acreage Trade Agreement by and among EQT, TH and TH Exploration II, LLC ("TH II"), dated July 8, 2020 (the "Agreement"). EQT and TH may be referred to herein together as the "Parties", and each individually as a "Party".

RECITALS

WHEREAS, EQT desires to transfer, convey and assign to TH certain of EQT's oil and gas leasehold interests located in Marshall County, West Virginia set forth on Exhibit A attached hereto and incorporated herein ("EQT Leases") in accordance with this Assignment and the Agreement; and

WHEREAS, TH desires to receive from EQT, all of EQT's right, title and interest in and to the EQT Leases in accordance with this Assignment and the Agreement.

NOW, THEREFORE, for and in consideration of the mutual promises contained herein and in the Agreement, the benefits to be derived by each Party hereunder and under the Agreement, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

ARTICLE I
DEFINED TERMS

1.1 *Definitions.* Capitalized terms used herein and not otherwise defined throughout this Assignment shall have the meanings given such terms in the Agreement.

ARTICLE II
ASSIGNMENT OF ASSETS

2.1 *Assignment.* Subject to the terms and conditions of this Assignment and the Agreement, EQT does hereby assign, convey and transfer to TH all of the right, title and interest of EQT in and to the following (collectively for purposes of this Assignment, the "EQT Assets"):

(a) Subject to the conveyance of the Wells Assets from EQT to TH II as described in the Agreement, the EQT Leases and appurtenances thereto (including rights of access and to install facilities), all Hydrocarbons within, produced from, derived from, or sold from the EQT Leases (and all proceeds related thereto), on and after the Valuation Date, and all Surface Contracts including but not limited to those set forth on Exhibit B attached hereto and incorporated herein (the "EQT Surface Contracts") related to the EQT Leases and such Hydrocarbons; and

(b) Copies of deeds, files and all other ownership information directly related to the acquisition, operations and maintenance of the EQT Leases, lease files for the EQT Leases

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ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "*Assignment*") is from STATOIL USA ONSHORE PROPERTIES INC., a Delaware corporation ("*Assignor*"), to TH Exploration, LLC, a Texas limited liability company ("*Assignee*"), and is executed on December 18, 2017 (the "*Effective Date*"). Assignor and Assignee may be referred to herein collectively as the "*Parties*," or individually as a "*Party*." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated August 24, 2017 (the "*Acreage Trade Agreement*").

**ARTICLE 1
ASSIGNMENT OF ASSETS**

Section 1.1 Assignment. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on Exhibit A attached hereto (the "*Leases*") INsofar AND ONLY INsofar as they cover those lands described on Exhibit A (the "*Leasehold Rights*") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "*Conveyed Assets*").

TO HAVE AND TO HOLD the Conveyed Assets, together with all and singular the rights, privileges, contracts and appurtenances, in any way appertaining or belonging thereto, unto Assignee, its successors and assigns, forever, subject, to the terms and conditions of this Assignment.

Section 1.2 Assignment Subject to Acreage Trade Agreement. This Assignment is made in accordance with and is subject to the terms, covenants and conditions contained in that certain Acreage Trade Agreement. In the event of a conflict between the provisions of the Acreage Trade Agreement and this Assignment, the provisions of the Acreage Trade Agreement shall control. The execution and delivery of this Assignment by Assignor, and the execution and acceptance of this Assignment by Assignee, shall not operate to release or impair any surviving rights or obligations of either Party with respect to the other under the Acreage Trade Agreement.

**ARTICLE 2
SPECIAL WARRANTY OF TITLE AND DISCLAIMERS**

Section 2.1 Special Warranty of Title. Assignor hereby agrees to warrant and defend Defensible Title to the Leases unto Assignee, its successors and assigns, against every Person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Assignor or any of its Affiliates, but not otherwise.

Section 2.2 Disclaimers of Warranties and Representations.

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN SECTION VI OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR

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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
05/25/2018 @ 02:36:09 PM
ASSIGNMENTS
Book 42 @ Page 109
Pages Recorded 9
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