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west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Monday, October 19, 2020  
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 TEN HIGH 1N-20HU  
47-051-02021-00-00

**Extended lateral and modified casing for an optional string of intermediate.**

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.

A handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned above the printed name and title.

James A. Martin  
Chief

Operator's Well Number: TEN HIGH 1N-20HU  
Farm Name: LAWRENCE & SHIRLEY CONKLE ESTS  
U.S. WELL NUMBER: 47-051-02021-00-00  
Horizontal 6A New Drill  
Date Modification Issued: October 19, 2020

Promoting a healthy environment.



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west virginia department of environmental protection

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Oil and Gas Conservation Commission  
601 57<sup>th</sup> Street SE, Charleston, WV 25304  
304-414-1239

Randall M. Albert, Chairman  
dep.wv.gov

July 22, 2020

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

RE: Application for Deep Well Permit – API #47-051-02021

COMPANY: Tug Hill Operating, LLC

FARM: Lawrence & Shirley Conkle Ests Ten High 1N-20HU

COUNTY: Marshall DISTRICT: Meade QUAD: Glen Easton

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

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

1. Comments to Notice of Deviation filed? No.
2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: \*\*yes
4. Provided a plat showing that the productive interval of the well meets the requirements of the Rules of the Commission W. Va. C.S.R. § 39-1-4.2.

Sincerely,

A handwritten signature in blue ink that reads "Susan Rose".

Susan Rose  
Administrator

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

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

2) Operator's Well Number: Ten High 1N-20HU      Well Pad Name: Ten High

3) Farm Name/Surface Owner: Lawrence & Shirley Conkle, ests      Public Road Access: Shepherd Ridge Lane CR 21/9

4) Elevation, current ground: 1310'      Elevation, proposed post-construction: 1310'

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

(b) If Gas Shallow  Deep   
Horizontal

*Handwritten:* JW 10/24/19

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Point Pleasant is the target formation at a depth of 11,673' - 11,812' thickness of 139' and anticipated pressure of approximately 9500 psi

8) Proposed Total Vertical Depth: 11,962'

9) Formation at Total Vertical Depth: Trenton

10) Proposed Total Measured Depth: 22,874'

11) Proposed Horizontal Leg Length: 9969.35'

12) Approximate Fresh Water Strata Depths: 70'; 1059'

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

14) Approximate Saltwater Depths: 2,167'

15) Approximate Coal Seam Depths: Sewickly Coal - 968' and Pittsburgh Coal - 1053'

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: Murray County Coal Co. / Marshall County Mine  
Depth: 1020' TVD and 290' subsea level  
Seam: Pittsburgh #8  
Owner: Murray Energy / Consolidated Coal Co.

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WW-6B  
(10/14)

4705102021 mod  
API NO. 47-051

OPERATOR WELL NO. Ten High 1N-20HU

Well Pad Name: Ten High

*Jee*  
*10/24/19*

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

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

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

Well to be completed with approximately 24,917,500 lb proppant and 385,243 bbl of water. Max rate = 80 bpm; max psi = 12,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 16.2

22) Area to be disturbed for well pad only, less access road (acres): 5.92

23) Describe centralizer placement for each casing string:

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

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

\*See Attachment

25) Proposed borehole conditioning procedures:

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

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\*Note: Attach additional sheets as needed.

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# CASING AND TUBING PROGRAM

4705102021  
MOD

Type	Size (in)	New Or Used	Grade	Weight per ft. (lb / ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.) / CTS
Conductor	30"	NEW	BW	BW	100'	100'	216FT^3(CTS)
Fresh Water	24"	NEW	S60	125.45	1,126'	1,126'	1,309FT^3(CTS)
Coal	18.625"	NEW	J55	106	2,801'	2,801'	2,371FT^3(CTS)
*Intermediate #1	13.325"	NEW	P110	68	6,801'	6,801'	4,382FT^3(CTS)
Intermediate #2	9.625"	NEW	P110	47	11,050'	11,050'	3,612FT^3(CTS)
Production	5.5"	NEW	P110	23	22,874'	22,874'	5,428FT^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		12,042'	
Liners							

*JW*  
*10/24/19*

Type	Size (in.)	Wellbore Diameter (in.)	Wall Thickness (in.)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	38	1.0	2333	1866	CLASS A	1.2
Fresh Water	24"	28	0.75	2750	1330	SEE #24	1.2
Coal	18.625"	22	.531	2740	1140	SEE #24	1.2
*Intermediate #1	13.325"	17	0.455	6910	2340	SEE #24	1.99
Intermediate #2	9.625"	12.25	0.472	10730	7210	SEE #24	1.99
Production	5.5"	8.5	0.415	14530	10864	SEE #24	1.18
Tubing	2 7/8"						
Liners							

\*Intermediate #1: To run if needed.

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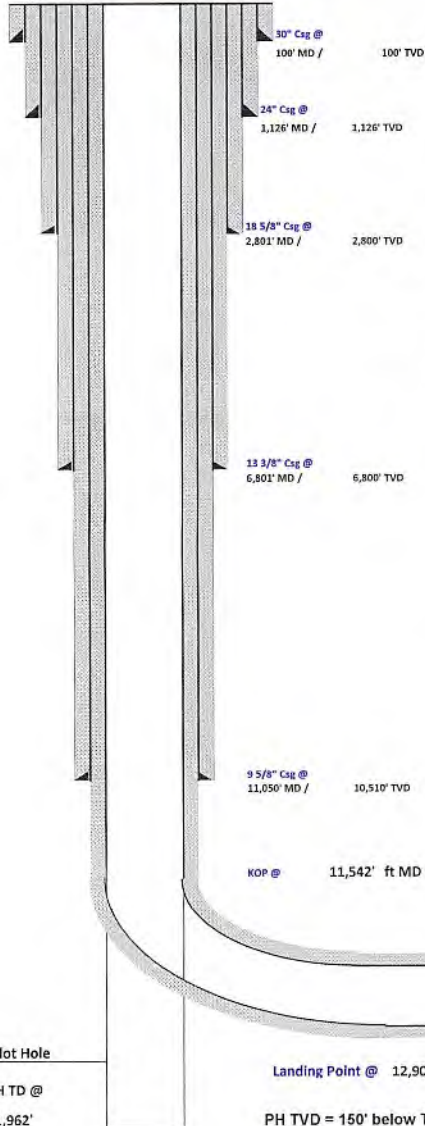
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4705102021 MD

**WELL NAME:** Ten High 1N-20HU  
**STATE:** West Virginia    **COUNTY:** Marshall  
**DISTRICT:** Meade  
**DF Elev:** 1,343'    **GL Elev:** 1,310'  
**TD:** 9,967'  
**TH Latitude:** 39.80672175  
**TH Longitude:** -80.68085356  
**BH Latitude:** 39.83574808  
**BH Longitude:** -80.69190285



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1,039'
Sewickley Coal	968'
Pittsburgh Coal	1,053'
Big Lime	2,128'
Berea	2,691'
Tully	6,629'
Marcellus	6,740'
Onondaga	6,791'
Sailna	7,530'
Lockport	8,545'
Utica	11,400'
Point Pleasant	11,673'
Landing Depth	11,723'
Trenton	11,812'
Pilot Hole TD	11,962'

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	100'	100'	BW	BW	Surface
Surface	28	24	1,126'	1,126'	125.45	S80	Surface
Intermediate 1	22	18 5/8	2,801'	2,800'	106	J55	Surface
Intermediate 2	17	13 3/8	6,801'	6,800'	68	P110	Surface
Intermediate 3	12 1/4	9 5/8	11,050'	10,510'	47	HP110	Surface
Production	8 1/2	5 1/2	22,874'	11,550'	23	HCP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	291	A	15.6	Air	None
Surface	1,478	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	2,345	A	15	Air	1 Centralizer every other jt
Intermediate 2	4,281	A	15	Air	1 Centralizer every other jt
Intermediate 3	2,715	A	14.5	Air	1 Centralizer every other jt
Production	4,793	A	15	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

*Handwritten signature: jey 10/24/19*

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Pilot Hole  
 PH TD @ 11,962'  
 Landing Point @ 12,906' MD / 11,723' TVD  
 PH TVD = 150' below Trenton Top

Lateral TD @ 22,874' ft MD  
 11,550' ft TVD



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

**Ten High 1N-20HU**

**Casing**

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	100'	CTS
Surface	24"	S60	28"	1,126'	CTS
Intermediate 1	18 5/8"	J55	22"	2,801'	CTS
Intermediate 2	13 3/8"	P110	17"	6,801'	CTS
Intermediate 3	9 5/8"	HP110	12 1/4"	11,050'	CTS
Production	5 1/2"	HCP110	8 1/2"	22,874'	CTS

**Cement**

- Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2
  
- Intermediate 1: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.0 ppg, Y=1.2
  
- Intermediate 2: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.0 ppg, Y=1.2
  
- Intermediate 3: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 14.5 ppg, Y=1.99
  
- Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.18

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Well: Ten High 1N-20HU (N)  
 Site: Ten High  
 Project: Marshall County, West Virginia.  
 Design: rev8  
 Rig: Nabors X08



4705102021 MOD

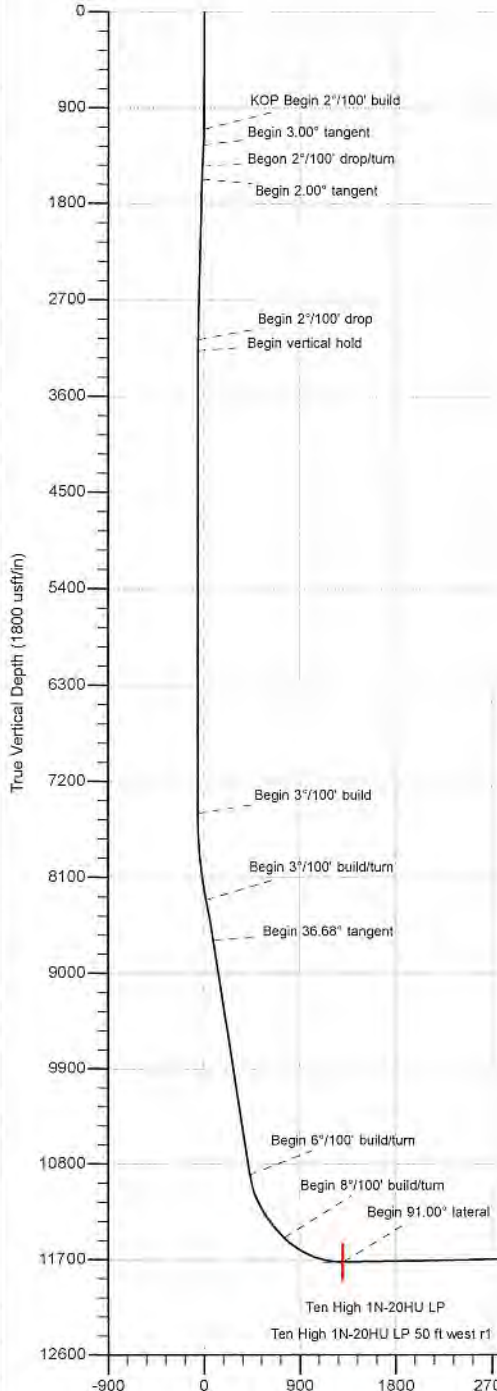
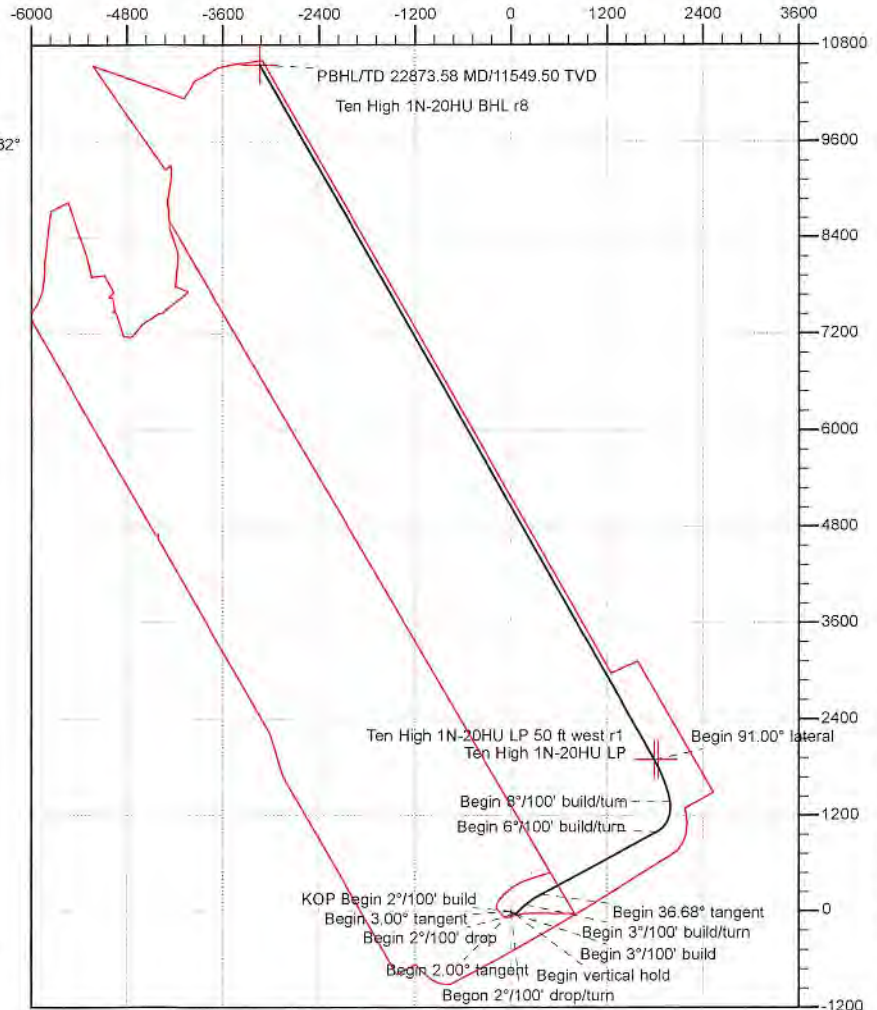
Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD83 West Virginia - HARN  
 Ellipsoid: GRS 1980  
 Zone: Zone 17N (84 W to 78 W)

West(-)/East(+) (2400 usft/in)

System Datum: Mean Sea Level  
 Depth Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)

Northing 14456514.04 Easting 1730045.49 Latitude 39.80672175 Longitude -80.68085356

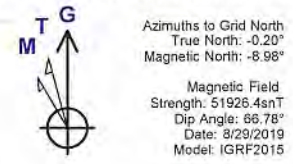
Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.982°



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSEct	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	
2	1100.00	0.00	0.00	1100.00	0.00	0.00	0.00	0.000	0.00	KOP Begin 2°/100' build
3	1250.00	3.00	170.00	1249.93	-3.87	0.68	2.00	170.000	-3.90	Begin 3.00° tangent
4	1450.00	3.00	170.00	1449.66	-14.17	2.50	0.00	0.000	-14.30	Begin 2°/100' drop/turn
5	1573.64	2.00	115.00	1573.19	-18.27	5.02	2.00	138.501	-18.95	Begin 2.00° tangent
6	3073.64	2.00	115.00	3072.28	-40.40	52.46	0.00	0.000	-53.67	Begin 2°/100' drop
7	3173.64	0.00	115.00	3172.28	-41.13	54.04	2.00	180.000	-54.83	Begin vertical hold
8	7501.38	0.00	115.00	7500.00	-41.13	54.04	0.00	115.000	-54.83	Begin 3°/100' build
9	8334.71	25.00	48.00	8307.14	78.60	187.02	3.00	48.000	22.04	Begin 3°/100' build/turn
10	8785.47	36.68	61.52	8693.94	207.13	377.04	3.00	36.686	91.08	Begin 36.68° tangent
11	11542.17	36.68	61.52	10904.64	992.37	1824.66	0.00	0.000	431.17	Begin 6°/100' build/turn
12	12283.94	45.00	351.76	11494.27	1377.11	1990.25	6.00	-108.833	752.75	Begin 8°/100' build/turn
13	12906.09	91.00	330.34	11723.40	1898.27	1792.20	8.00	-28.572	1308.75	Begin 91.00° lateral
14	22873.59	91.00	330.34	11549.50	10558.49	-3139.48	0.00	0.000	1015.35	PBHL/TD 22873.58 MD/11549.50 TVD

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PBHL/TD 22873.58 MD/11549.50 TVD

Ten High 1N-20HU BHL r8





<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Ten High 1N-20HU (N)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>North Reference:</b>	Grid
<b>Well:</b>	Ten High 1N-20HU (N)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev8		

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

<b>Site</b>	Ten High				
<b>Site Position:</b>		<b>Northing:</b>	14,456,545.60 usft	<b>Latitude:</b>	39.80680885
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,730,001.41 usft	<b>Longitude:</b>	-80.68101011
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.204 °

<b>Well</b>	Ten High 1N-20HU (N)					
<b>Well Position</b>	+N-S	0.00 usft	<b>Northing:</b>	14,456,514.04 usft	<b>Latitude:</b>	39.80672175
	+E-W	0.00 usft	<b>Easting:</b>	1,730,045.49 usft	<b>Longitude:</b>	-80.68085356
<b>Position Uncertainty</b>	0.00 usft		<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,310.00 usft

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	8/29/2019	-8.778	66.784	51,926.44996712

<b>Design</b>	rev8			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	343.44

<b>Plan Survey Tool Program</b>	<b>Date</b>	10/16/2019		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	22,873.59 rev8 (Original Hole)	MWD	MWD - Standard

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4705102021 Map



<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Ten High 1N-20HU (N)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>North Reference:</b>	Grid
<b>Well:</b>	Ten High 1N-20HU (N)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev8		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,250.00	3.00	170.00	1,249.93	-3.87	0.68	2.00	2.00	0.00	170.000	
1,450.00	3.00	170.00	1,449.66	-14.17	2.50	0.00	0.00	0.00	0.000	
1,573.64	2.00	115.00	1,573.19	-18.27	5.02	2.00	-0.81	-44.48	-138.501	
3,073.64	2.00	115.00	3,072.28	-40.40	52.46	0.00	0.00	0.00	0.000	
3,173.64	0.00	115.00	3,172.26	-41.13	54.04	2.00	-2.00	0.00	180.000	
7,501.38	0.00	115.00	7,500.00	-41.13	54.04	0.00	0.00	0.00	115.000	
8,334.71	25.00	48.00	8,307.14	78.60	187.02	3.00	3.00	0.00	48.000	
8,785.47	36.68	61.52	8,693.94	207.13	377.04	3.00	2.59	3.00	36.686	
11,542.17	36.68	61.52	10,904.64	992.37	1,824.66	0.00	0.00	0.00	0.000	
12,283.94	45.00	351.76	11,494.27	1,377.11	1,990.25	6.00	1.12	-9.40	-108.833	
12,906.09	91.00	330.34	11,723.40	1,898.27	1,792.20	8.00	7.39	-3.44	-28.572	
22,873.59	91.00	330.34	11,549.50	10,558.49	-3,139.48	0.00	0.00	0.00	0.000	Ten High 1N-20HU BI

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Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Ten High 1N-20HU (N)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Project:	Marshall County, West Virginia.	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-20HU (N)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev8		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
100.00	0.00	0.00	100.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
200.00	0.00	0.00	200.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
300.00	0.00	0.00	300.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
400.00	0.00	0.00	400.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
500.00	0.00	0.00	500.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
600.00	0.00	0.00	600.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
700.00	0.00	0.00	700.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
800.00	0.00	0.00	800.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
900.00	0.00	0.00	900.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,456,514.04	1,730,045.49	39.80672175	-80.68085356
<b>KOP Begin 2°/100' build</b>									
1,200.00	2.00	170.00	1,199.98	-1.72	0.30	14,456,512.32	1,730,045.80	39.80671703	-80.68085250
1,250.00	3.00	170.00	1,249.93	-3.87	0.68	14,456,510.18	1,730,046.18	39.80671113	-80.68085118
<b>Begin 3.00° tangent</b>									
1,300.00	3.00	170.00	1,299.86	-6.44	1.14	14,456,507.60	1,730,046.63	39.80670405	-80.68084960
1,400.00	3.00	170.00	1,399.73	-11.60	2.04	14,456,502.45	1,730,047.54	39.80668988	-80.68084643
1,450.00	3.00	170.00	1,449.66	-14.17	2.50	14,456,499.87	1,730,047.99	39.80668280	-80.68084484
<b>Begin 2°/100' drop/turn</b>									
1,500.00	2.35	153.59	1,499.60	-16.38	3.18	14,456,497.66	1,730,048.68	39.80667674	-80.68084244
1,573.64	2.00	115.00	1,573.19	-18.27	5.02	14,456,495.77	1,730,050.51	39.80667152	-80.68083593
<b>Begin 2.00° tangent</b>									
1,600.00	2.00	115.00	1,599.54	-18.66	5.85	14,456,495.38	1,730,051.34	39.80667044	-80.68083296
1,700.00	2.00	115.00	1,699.48	-20.14	9.01	14,456,493.91	1,730,054.51	39.80666636	-80.68082172
1,800.00	2.00	115.00	1,799.42	-21.61	12.18	14,456,492.43	1,730,057.67	39.80666228	-80.68081048
1,900.00	2.00	115.00	1,899.36	-23.09	15.34	14,456,490.96	1,730,060.83	39.80665820	-80.68079923
2,000.00	2.00	115.00	1,999.29	-24.56	18.50	14,456,489.48	1,730,064.00	39.80665412	-80.68078799
2,100.00	2.00	115.00	2,099.23	-26.04	21.67	14,456,488.01	1,730,067.16	39.80665004	-80.68077675
2,200.00	2.00	115.00	2,199.17	-27.51	24.83	14,456,486.53	1,730,070.32	39.80664596	-80.68076550
2,300.00	2.00	115.00	2,299.11	-28.99	27.99	14,456,485.06	1,730,073.48	39.80664187	-80.68075426
2,400.00	2.00	115.00	2,399.05	-30.46	31.15	14,456,483.58	1,730,076.65	39.80663779	-80.68074302
2,500.00	2.00	115.00	2,498.99	-31.94	34.32	14,456,482.11	1,730,079.81	39.80663371	-80.68073177
2,600.00	2.00	115.00	2,598.93	-33.41	37.48	14,456,480.63	1,730,082.97	39.80662963	-80.68072053
2,700.00	2.00	115.00	2,698.87	-34.89	40.64	14,456,479.16	1,730,086.14	39.80662555	-80.68070928
2,800.00	2.00	115.00	2,798.81	-36.36	43.81	14,456,477.68	1,730,089.30	39.80662147	-80.68069804
2,900.00	2.00	115.00	2,898.75	-37.84	46.97	14,456,476.21	1,730,092.46	39.80661739	-80.68068680
3,000.00	2.00	115.00	2,998.69	-39.31	50.13	14,456,474.73	1,730,095.63	39.80661330	-80.68067555
3,073.64	2.00	115.00	3,072.28	-40.40	52.46	14,456,473.65	1,730,097.95	39.80661030	-80.68066727
<b>Begin 2°/100' drop</b>									
3,100.00	1.47	115.00	3,098.63	-40.73	53.19	14,456,473.31	1,730,098.68	39.80660936	-80.68066470
3,173.64	0.00	115.00	3,172.26	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
<b>Begin vertical hold</b>									
3,200.00	0.00	0.00	3,198.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
3,300.00	0.00	115.00	3,298.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
3,400.00	0.00	115.00	3,398.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
3,500.00	0.00	115.00	3,498.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
3,600.00	0.00	0.00	3,598.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
3,700.00	0.00	115.00	3,698.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
3,800.00	0.00	115.00	3,798.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
3,900.00	0.00	115.00	3,898.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
4,000.00	0.00	0.00	3,998.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
4,100.00	0.00	115.00	4,098.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165
4,200.00	0.00	115.00	4,198.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165



4705102021 mod

Database:	DB_Aug1919_v14	Local Co-ordinate Reference:	Well Ten High 1N-20HU (N)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Project:	Marshall County, West Virginia.	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-20HU (N)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev8		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,300.00	0.00	115.00	4,298.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
4,400.00	0.00	115.00	4,398.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
4,500.00	0.00	0.00	4,498.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
4,600.00	0.00	115.00	4,598.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
4,700.00	0.00	0.00	4,698.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
4,800.00	0.00	115.00	4,798.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
4,900.00	0.00	0.00	4,898.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,000.00	0.00	115.00	4,998.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,100.00	0.00	0.00	5,098.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,200.00	0.00	115.00	5,198.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,300.00	0.00	0.00	5,298.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,400.00	0.00	115.00	5,398.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,500.00	0.00	0.00	5,498.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,600.00	0.00	115.00	5,598.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,700.00	0.00	0.00	5,698.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,800.00	0.00	115.00	5,798.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
5,900.00	0.00	0.00	5,898.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,000.00	0.00	115.00	5,998.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,100.00	0.00	115.00	6,098.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,200.00	0.00	0.00	6,198.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,300.00	0.00	115.00	6,298.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,400.00	0.00	0.00	6,398.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,500.00	0.00	115.00	6,498.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,600.00	0.00	0.00	6,598.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,700.00	0.00	115.00	6,698.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,800.00	0.00	0.00	6,798.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
6,900.00	0.00	115.00	6,898.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
7,000.00	0.00	0.00	6,998.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
7,100.00	0.00	115.00	7,098.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
7,200.00	0.00	0.00	7,198.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
7,300.00	0.00	115.00	7,298.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
7,400.00	0.00	0.00	7,398.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
7,500.00	0.00	115.00	7,498.62	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
7,501.38	0.00	115.00	7,500.00	-41.13	54.04	14,456,472.91	1,730,099.54	39.80660826	-80.68066165	
<b>Begin 3°/100' build</b>										
7,600.00	2.96	48.00	7,598.58	-39.43	55.93	14,456,474.61	1,730,101.43	39.80661292	-80.68065489	
7,700.00	5.96	48.00	7,698.26	-34.23	61.71	14,456,479.81	1,730,107.20	39.80662714	-80.68063426	
7,800.00	8.96	48.00	7,797.41	-25.55	71.36	14,456,488.50	1,730,116.85	39.80665090	-80.68059980	
7,900.00	11.96	48.00	7,895.73	-13.40	84.85	14,456,500.64	1,730,130.34	39.80668412	-80.68055162	
8,000.00	14.96	48.00	7,992.98	2.17	102.14	14,456,516.21	1,730,147.63	39.80672672	-80.68048984	
8,100.00	17.96	48.00	8,088.87	21.13	123.19	14,456,535.17	1,730,168.69	39.80677857	-80.68041464	
8,200.00	20.96	48.00	8,183.14	43.42	147.95	14,456,557.46	1,730,193.44	39.80683953	-80.68032622	
8,300.00	23.96	48.00	8,275.55	68.97	176.33	14,456,583.02	1,730,221.82	39.80690944	-80.68022482	
8,334.71	25.00	48.00	8,307.14	78.60	187.02	14,456,592.64	1,730,232.51	39.80693577	-80.68018664	
<b>Begin 3°/100' build/turn</b>										
8,400.00	26.59	50.61	8,365.92	97.10	208.57	14,456,611.15	1,730,254.06	39.80698638	-80.68010967	
8,500.00	29.12	54.09	8,454.33	125.58	245.58	14,456,639.63	1,730,291.08	39.80706423	-80.67997751	
8,600.00	31.72	57.05	8,540.57	154.16	287.36	14,456,668.20	1,730,332.85	39.80714228	-80.67982839	
8,700.00	34.38	59.60	8,624.39	182.74	333.78	14,456,696.79	1,730,379.27	39.80722033	-80.67966274	
8,785.47	36.68	61.52	8,693.94	207.13	377.04	14,456,721.17	1,730,422.53	39.80728688	-80.67950839	
<b>Begin 36.68° tangent</b>										
8,800.00	36.68	61.52	8,705.59	211.27	384.67	14,456,725.31	1,730,430.16	39.80729817	-80.67948117	
8,900.00	36.68	61.52	8,785.79	239.75	437.18	14,456,753.80	1,730,482.68	39.80737588	-80.67929382	
9,000.00	36.68	61.52	8,865.98	268.24	489.70	14,456,782.28	1,730,535.19	39.80745359	-80.67910647	

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Ten High 1N-20HU (N)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>North Reference:</b>	Grid
<b>Well:</b>	Ten High 1N-20HU (N)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev8		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,100.00	36.68	61.52	8,946.17	296.72	542.21	14,456,810.77	1,730,587.70	39.80753130	-80.67891912	
9,200.00	36.68	61.52	9,026.37	325.21	594.72	14,456,839.25	1,730,640.22	39.80760901	-80.67873178	
9,300.00	36.68	61.52	9,106.56	353.69	647.23	14,456,867.74	1,730,692.73	39.80768672	-80.67854443	
9,400.00	36.68	61.52	9,186.75	382.18	699.75	14,456,896.22	1,730,745.24	39.80776442	-80.67835708	
9,500.00	36.68	61.52	9,266.95	410.66	752.26	14,456,924.71	1,730,797.75	39.80784213	-80.67816973	
9,600.00	36.68	61.52	9,347.14	439.15	804.77	14,456,953.19	1,730,850.27	39.80791984	-80.67798238	
9,700.00	36.68	61.52	9,427.33	467.63	857.29	14,456,981.68	1,730,902.78	39.80799755	-80.67779502	
9,800.00	36.68	61.52	9,507.53	496.12	909.80	14,457,010.16	1,730,955.29	39.80807525	-80.67760767	
9,900.00	36.68	61.52	9,587.72	524.60	962.31	14,457,038.65	1,731,007.80	39.80815296	-80.67742032	
10,000.00	36.68	61.52	9,667.92	553.09	1,014.82	14,457,067.13	1,731,060.32	39.80823067	-80.67723297	
10,100.00	36.68	61.52	9,748.11	581.57	1,067.34	14,457,095.62	1,731,112.83	39.80830837	-80.67704562	
10,200.00	36.68	61.52	9,828.30	610.06	1,119.85	14,457,124.10	1,731,165.34	39.80838608	-80.67685826	
10,300.00	36.68	61.52	9,908.50	638.54	1,172.36	14,457,152.58	1,731,217.86	39.80846379	-80.67667091	
10,400.00	36.68	61.52	9,988.69	667.03	1,224.88	14,457,181.07	1,731,270.37	39.80854149	-80.67648356	
10,500.00	36.68	61.52	10,068.88	695.51	1,277.39	14,457,209.55	1,731,322.88	39.80861920	-80.67629620	
10,600.00	36.68	61.52	10,149.08	724.00	1,329.90	14,457,238.04	1,731,375.39	39.80869690	-80.67610885	
10,700.00	36.68	61.52	10,229.27	752.48	1,382.41	14,457,266.52	1,731,427.91	39.80877460	-80.67592149	
10,800.00	36.68	61.52	10,309.46	780.97	1,434.93	14,457,295.01	1,731,480.42	39.80885231	-80.67573414	
10,900.00	36.68	61.52	10,389.66	809.45	1,487.44	14,457,323.49	1,731,532.93	39.80893001	-80.67554678	
11,000.00	36.68	61.52	10,469.85	837.94	1,539.95	14,457,351.98	1,731,585.45	39.80900772	-80.67535942	
11,100.00	36.68	61.52	10,550.04	866.42	1,592.47	14,457,380.46	1,731,637.96	39.80908542	-80.67517207	
11,200.00	36.68	61.52	10,630.24	894.91	1,644.98	14,457,408.95	1,731,690.47	39.80916312	-80.67498471	
11,300.00	36.68	61.52	10,710.43	923.39	1,697.49	14,457,437.43	1,731,742.98	39.80924082	-80.67479735	
11,400.00	36.68	61.52	10,790.63	951.88	1,750.00	14,457,465.92	1,731,795.50	39.80931853	-80.67460999	
11,500.00	36.68	61.52	10,870.82	980.36	1,802.52	14,457,494.40	1,731,848.01	39.80939623	-80.67442263	
11,542.17	36.68	61.52	10,904.64	992.37	1,824.66	14,457,506.42	1,731,870.15	39.80942899	-80.67434363	
<b>Begin 6°/100' build/turn</b>										
11,600.00	35.69	55.89	10,951.32	1,010.08	1,853.82	14,457,524.12	1,731,899.32	39.80947732	-80.67423956	
11,700.00	34.64	45.62	11,033.14	1,046.35	1,898.33	14,457,560.39	1,731,943.83	39.80957648	-80.67408060	
11,800.00	34.48	35.04	11,115.57	1,089.44	1,934.93	14,457,603.48	1,731,980.43	39.80969445	-80.67394971	
11,900.00	35.23	24.61	11,197.70	1,138.88	1,963.22	14,457,652.92	1,732,008.72	39.80982995	-80.67384833	
12,000.00	36.82	14.77	11,278.65	1,194.13	1,982.89	14,457,708.17	1,732,028.38	39.80998148	-80.67377757	
12,100.00	39.17	5.79	11,357.51	1,254.58	1,993.72	14,457,768.62	1,732,039.22	39.81014738	-80.67373821	
12,200.00	42.13	357.77	11,433.42	1,319.57	1,995.60	14,457,833.61	1,732,041.10	39.81032584	-80.67373068	
12,283.94	45.00	351.76	11,494.27	1,377.11	1,990.25	14,457,891.15	1,732,035.74	39.81048391	-80.67374899	
<b>Begin 8°/100' build/turn</b>										
12,300.00	46.13	350.91	11,505.51	1,388.44	1,988.52	14,457,902.49	1,732,034.02	39.81051506	-80.67375500	
12,400.00	53.30	346.24	11,570.15	1,463.10	1,973.26	14,457,977.14	1,732,018.76	39.81072023	-80.67380837	
12,500.00	60.62	342.37	11,624.65	1,543.69	1,950.50	14,458,057.73	1,731,995.99	39.81094177	-80.67388839	
12,600.00	68.03	339.04	11,667.96	1,628.65	1,920.67	14,458,142.69	1,731,966.16	39.81117539	-80.67399351	
12,700.00	75.50	336.03	11,699.24	1,716.32	1,884.35	14,458,230.36	1,731,929.84	39.81141653	-80.67412169	
12,800.00	83.01	333.22	11,717.86	1,805.01	1,842.26	14,458,319.05	1,731,887.75	39.81166050	-80.67427044	
12,900.00	90.54	330.50	11,723.48	1,892.97	1,795.21	14,458,407.02	1,731,840.70	39.81190255	-80.67443684	
12,906.09	91.00	330.34	11,723.40	1,898.27	1,792.20	14,458,412.31	1,731,837.69	39.81191713	-80.67444748	
<b>Begin 91.00° lateral</b>										
13,000.00	91.00	330.34	11,721.76	1,979.86	1,745.74	14,458,493.91	1,731,791.23	39.81214167	-80.67461188	
13,100.00	91.00	330.34	11,720.02	2,066.75	1,696.26	14,458,580.79	1,731,741.75	39.81238077	-80.67478695	
13,200.00	91.00	330.34	11,718.27	2,153.63	1,646.78	14,458,667.67	1,731,692.27	39.81261986	-80.67496201	
13,300.00	91.00	330.34	11,716.53	2,240.52	1,597.30	14,458,754.56	1,731,642.80	39.81285896	-80.67513708	
13,400.00	91.00	330.34	11,714.78	2,327.40	1,547.83	14,458,841.44	1,731,593.32	39.81309806	-80.67531215	
13,500.00	91.00	330.34	11,713.04	2,414.29	1,498.35	14,458,928.33	1,731,543.84	39.81333716	-80.67548721	
13,600.00	91.00	330.34	11,711.29	2,501.17	1,448.87	14,459,015.21	1,731,494.36	39.81357626	-80.67566229	
13,700.00	91.00	330.34	11,709.55	2,588.05	1,399.39	14,459,102.10	1,731,444.89	39.81381536	-80.67583736	
13,800.00	91.00	330.34	11,707.80	2,674.94	1,349.92	14,459,188.98	1,731,395.41	39.81405446	-80.67601243	



4705102021 MOD  
 Planning Report - Geographic



<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Ten High 1N-20HU (N)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>North Reference:</b>	Grid
<b>Well:</b>	Ten High 1N-20HU (N)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev8		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
13,900.00	91.00	330.34	11,706.06	2,761.82	1,300.44	14,459,275.87	1,731,345.93	39.81429355	-80.67618750	
14,000.00	91.00	330.34	11,704.32	2,848.71	1,250.96	14,459,362.75	1,731,296.45	39.81453265	-80.67636258	
14,100.00	91.00	330.34	11,702.57	2,935.59	1,201.48	14,459,449.64	1,731,246.98	39.81477175	-80.67653766	
14,200.00	91.00	330.34	11,700.83	3,022.48	1,152.00	14,459,536.52	1,731,197.50	39.81501084	-80.67671273	
14,300.00	91.00	330.34	11,699.08	3,109.36	1,102.53	14,459,623.41	1,731,148.02	39.81524994	-80.67688781	
14,400.00	91.00	330.34	11,697.34	3,196.25	1,053.05	14,459,710.29	1,731,098.54	39.81548904	-80.67706289	
14,500.00	91.00	330.34	11,695.59	3,283.13	1,003.57	14,459,797.17	1,731,049.07	39.81572813	-80.67723797	
14,600.00	91.00	330.34	11,693.85	3,370.02	954.09	14,459,884.06	1,730,999.59	39.81596723	-80.67741306	
14,700.00	91.00	330.34	11,692.10	3,456.90	904.62	14,459,970.94	1,730,950.11	39.81620632	-80.67758814	
14,800.00	91.00	330.34	11,690.36	3,543.78	855.14	14,460,057.83	1,730,900.63	39.81644542	-80.67776322	
14,900.00	91.00	330.34	11,688.61	3,630.67	805.66	14,460,144.71	1,730,851.16	39.81668451	-80.67793831	
15,000.00	91.00	330.34	11,686.87	3,717.55	756.18	14,460,231.60	1,730,801.68	39.81692361	-80.67811340	
15,100.00	91.00	330.34	11,685.12	3,804.44	706.71	14,460,318.48	1,730,752.20	39.81716270	-80.67828849	
15,200.00	91.00	330.34	11,683.38	3,891.32	657.23	14,460,405.37	1,730,702.72	39.81740180	-80.67846358	
15,300.00	91.00	330.34	11,681.63	3,978.21	607.75	14,460,492.25	1,730,653.25	39.81764089	-80.67863867	
15,400.00	91.00	330.34	11,679.89	4,065.09	558.27	14,460,579.14	1,730,603.77	39.81787998	-80.67881376	
15,500.00	91.00	330.34	11,678.15	4,151.98	508.80	14,460,666.02	1,730,554.29	39.81811908	-80.67898885	
15,600.00	91.00	330.34	11,676.40	4,238.86	459.32	14,460,752.90	1,730,504.81	39.81835817	-80.67916395	
15,700.00	91.00	330.34	11,674.66	4,325.75	409.84	14,460,839.79	1,730,455.33	39.81859726	-80.67933904	
15,800.00	91.00	330.34	11,672.91	4,412.63	360.36	14,460,926.67	1,730,405.86	39.81883635	-80.67951414	
15,900.00	91.00	330.34	11,671.17	4,499.51	310.89	14,461,013.56	1,730,356.38	39.81907545	-80.67968924	
16,000.00	91.00	330.34	11,669.42	4,586.40	261.41	14,461,100.44	1,730,306.90	39.81931454	-80.67986434	
16,100.00	91.00	330.34	11,667.68	4,673.28	211.93	14,461,187.33	1,730,257.42	39.81955363	-80.68003944	
16,200.00	91.00	330.34	11,665.93	4,760.17	162.45	14,461,274.21	1,730,207.95	39.81979272	-80.68021454	
16,300.00	91.00	330.34	11,664.19	4,847.05	112.98	14,461,361.10	1,730,158.47	39.82003181	-80.68038964	
16,400.00	91.00	330.34	11,662.44	4,933.94	63.50	14,461,447.98	1,730,108.99	39.82027090	-80.68056475	
16,500.00	91.00	330.34	11,660.70	5,020.82	14.02	14,461,534.87	1,730,059.51	39.82050999	-80.68073985	
16,600.00	91.00	330.34	11,658.95	5,107.71	-35.46	14,461,621.75	1,730,010.04	39.82074908	-80.68091496	
16,700.00	91.00	330.34	11,657.21	5,194.59	-84.93	14,461,708.63	1,729,960.56	39.82098817	-80.68109007	
16,800.00	91.00	330.34	11,655.46	5,281.48	-134.41	14,461,795.52	1,729,911.08	39.82122726	-80.68126518	
16,900.00	91.00	330.34	11,653.72	5,368.36	-183.89	14,461,882.40	1,729,861.60	39.82146635	-80.68144029	
17,000.00	91.00	330.34	11,651.97	5,455.24	-233.37	14,461,969.29	1,729,812.13	39.82170544	-80.68161540	
17,100.00	91.00	330.34	11,650.23	5,542.13	-282.84	14,462,056.17	1,729,762.65	39.82194453	-80.68179051	
17,200.00	91.00	330.34	11,648.49	5,629.01	-332.32	14,462,143.06	1,729,713.17	39.82218362	-80.68196562	
17,300.00	91.00	330.34	11,646.74	5,715.90	-381.80	14,462,229.94	1,729,663.69	39.82242271	-80.68214074	
17,400.00	91.00	330.34	11,645.00	5,802.78	-431.28	14,462,316.83	1,729,614.22	39.82266180	-80.68231586	
17,500.00	91.00	330.34	11,643.25	5,889.67	-480.75	14,462,403.71	1,729,564.74	39.82290088	-80.68249097	
17,600.00	91.00	330.34	11,641.51	5,976.55	-530.23	14,462,490.60	1,729,515.26	39.82313997	-80.68266609	
17,700.00	91.00	330.34	11,639.76	6,063.44	-579.71	14,462,577.48	1,729,465.78	39.82337906	-80.68284121	
17,800.00	91.00	330.34	11,638.02	6,150.32	-629.19	14,462,664.36	1,729,416.31	39.82361814	-80.68301633	
17,900.00	91.00	330.34	11,636.27	6,237.21	-678.67	14,462,751.25	1,729,366.83	39.82385723	-80.68319146	
18,000.00	91.00	330.34	11,634.53	6,324.09	-728.14	14,462,838.13	1,729,317.35	39.82409632	-80.68336658	
18,100.00	91.00	330.34	11,632.78	6,410.98	-777.62	14,462,925.02	1,729,267.87	39.82433540	-80.68354170	
18,200.00	91.00	330.34	11,631.04	6,497.86	-827.10	14,463,011.90	1,729,218.40	39.82457449	-80.68371683	
18,300.00	91.00	330.34	11,629.29	6,584.74	-876.58	14,463,098.79	1,729,168.92	39.82481358	-80.68389196	
18,400.00	91.00	330.34	11,627.55	6,671.63	-926.05	14,463,185.67	1,729,119.44	39.82505266	-80.68406709	
18,500.00	91.00	330.34	11,625.80	6,758.51	-975.53	14,463,272.56	1,729,069.96	39.82529175	-80.68424222	
18,600.00	91.00	330.34	11,624.06	6,845.40	-1,025.01	14,463,359.44	1,729,020.49	39.82553083	-80.68441735	
18,700.00	91.00	330.34	11,622.32	6,932.28	-1,074.49	14,463,446.33	1,728,971.01	39.82576992	-80.68459248	
18,800.00	91.00	330.34	11,620.57	7,019.17	-1,123.96	14,463,533.21	1,728,921.53	39.82600900	-80.68476761	
18,900.00	91.00	330.34	11,618.83	7,106.05	-1,173.44	14,463,620.09	1,728,872.05	39.82624808	-80.68494275	
19,000.00	91.00	330.34	11,617.08	7,192.94	-1,222.92	14,463,706.98	1,728,822.57	39.82648717	-80.68511788	
19,100.00	91.00	330.34	11,615.34	7,279.82	-1,272.40	14,463,793.86	1,728,773.10	39.82672625	-80.68529302	
19,200.00	91.00	330.34	11,613.59	7,366.71	-1,321.87	14,463,880.75	1,728,723.62	39.82696533	-80.68546816	
19,300.00	91.00	330.34	11,611.85	7,453.59	-1,371.35	14,463,967.63	1,728,674.14	39.82720442	-80.68564330	



4705102021 MoP

Planning Report - Geographic



<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Ten High 1N-20HU (N)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>North Reference:</b>	Grid
<b>Well:</b>	Ten High 1N-20HU (N)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev8		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
19,400.00	91.00	330.34	11,610.10	7,540.47	-1,420.83	14,464,054.52	1,728,624.66	39.82744350	-80.68581844	
19,500.00	91.00	330.34	11,608.36	7,627.36	-1,470.31	14,464,141.40	1,728,575.19	39.82768258	-80.68599358	
19,600.00	91.00	330.34	11,606.61	7,714.24	-1,519.78	14,464,228.29	1,728,525.71	39.82792166	-80.68616872	
19,700.00	91.00	330.34	11,604.87	7,801.13	-1,569.26	14,464,315.17	1,728,476.23	39.82816075	-80.68634387	
19,800.00	91.00	330.34	11,603.12	7,888.01	-1,618.74	14,464,402.06	1,728,426.75	39.82839983	-80.68651901	
19,900.00	91.00	330.34	11,601.38	7,974.90	-1,668.22	14,464,488.94	1,728,377.28	39.82863891	-80.68669416	
20,000.00	91.00	330.34	11,599.63	8,061.78	-1,717.69	14,464,575.82	1,728,327.80	39.82887799	-80.68686931	
20,100.00	91.00	330.34	11,597.89	8,148.67	-1,767.17	14,464,662.71	1,728,278.32	39.82911707	-80.68704445	
20,200.00	91.00	330.34	11,596.15	8,235.55	-1,816.65	14,464,749.59	1,728,228.84	39.82935615	-80.68721960	
20,300.00	91.00	330.34	11,594.40	8,322.44	-1,866.13	14,464,836.48	1,728,179.37	39.82959523	-80.68739476	
20,400.00	91.00	330.34	11,592.66	8,409.32	-1,915.60	14,464,923.36	1,728,129.89	39.82983431	-80.68756991	
20,500.00	91.00	330.34	11,590.91	8,496.20	-1,965.08	14,465,010.25	1,728,080.41	39.83007339	-80.68774506	
20,600.00	91.00	330.34	11,589.17	8,583.09	-2,014.56	14,465,097.13	1,728,030.93	39.83031247	-80.68792022	
20,700.00	91.00	330.34	11,587.42	8,669.97	-2,064.04	14,465,184.02	1,727,981.46	39.83055155	-80.68809537	
20,800.00	91.00	330.34	11,585.68	8,756.86	-2,113.51	14,465,270.90	1,727,931.98	39.83079063	-80.68827053	
20,900.00	91.00	330.34	11,583.93	8,843.74	-2,162.99	14,465,357.79	1,727,882.50	39.83102971	-80.68844569	
21,000.00	91.00	330.34	11,582.19	8,930.63	-2,212.47	14,465,444.67	1,727,833.02	39.83126879	-80.68862085	
21,100.00	91.00	330.34	11,580.44	9,017.51	-2,261.95	14,465,531.55	1,727,783.55	39.83150786	-80.68879601	
21,200.00	91.00	330.34	11,578.70	9,104.40	-2,311.43	14,465,618.44	1,727,734.07	39.83174694	-80.68897117	
21,300.00	91.00	330.34	11,576.95	9,191.28	-2,360.90	14,465,705.32	1,727,684.59	39.83198602	-80.68914634	
21,400.00	91.00	330.34	11,575.21	9,278.17	-2,410.38	14,465,792.21	1,727,635.11	39.83222510	-80.68932150	
21,500.00	91.00	330.34	11,573.46	9,365.05	-2,459.86	14,465,879.09	1,727,585.64	39.83246417	-80.68949667	
21,600.00	91.00	330.34	11,571.72	9,451.93	-2,509.34	14,465,965.98	1,727,536.16	39.83270325	-80.68967183	
21,700.00	91.00	330.34	11,569.98	9,538.82	-2,558.81	14,466,052.86	1,727,486.68	39.83294233	-80.68984700	
21,800.00	91.00	330.34	11,568.23	9,625.70	-2,608.29	14,466,139.75	1,727,437.20	39.83318140	-80.69002217	
21,900.00	91.00	330.34	11,566.49	9,712.59	-2,657.77	14,466,226.63	1,727,387.73	39.83342048	-80.69019734	
22,000.00	91.00	330.34	11,564.74	9,799.47	-2,707.25	14,466,313.52	1,727,338.25	39.83365955	-80.69037252	
22,100.00	91.00	330.34	11,563.00	9,886.36	-2,756.72	14,466,400.40	1,727,288.77	39.83389863	-80.69054769	
22,200.00	91.00	330.34	11,561.25	9,973.24	-2,806.20	14,466,487.29	1,727,239.29	39.83413771	-80.69072286	
22,300.00	91.00	330.34	11,559.51	10,060.13	-2,855.68	14,466,574.17	1,727,189.82	39.83437678	-80.69089804	
22,400.00	91.00	330.34	11,557.76	10,147.01	-2,905.16	14,466,661.05	1,727,140.34	39.83461585	-80.69107322	
22,500.00	91.00	330.34	11,556.02	10,233.90	-2,954.63	14,466,747.94	1,727,090.86	39.83485493	-80.69124839	
22,600.00	91.00	330.34	11,554.27	10,320.78	-3,004.11	14,466,834.82	1,727,041.38	39.83509400	-80.69142357	
22,700.00	91.00	330.34	11,552.53	10,407.66	-3,053.59	14,466,921.71	1,726,991.90	39.83533308	-80.69159875	
22,800.00	91.00	330.34	11,550.78	10,494.55	-3,103.07	14,467,008.59	1,726,942.43	39.83557215	-80.69177394	
22,873.58	91.00	330.34	11,549.50	10,558.48	-3,139.47	14,467,072.52	1,726,906.02	39.83574806	-80.69190283	
<b>PBHL/TD 22873.58 MD/11549.50 TVD</b>										
22,873.59	91.00	330.34	11,549.50	10,558.49	-3,139.48	14,467,072.53	1,726,906.02	39.83574808	-80.69190285	

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<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>North Reference:</b>	Grid
<b>Well:</b>	Ten High 1N-20HU (N)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev8		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Ten High 1N-20HU BHL - plan hits target center - Point	0.00	0.00	11,549.50	10,558.49	-3,139.48	14,467,072.53	1,726,906.02	39.83574808	-80.69190285
Ten High 1N-20HU LP - plan misses target center by 44.06usft at 12882.49usft MD (11723.45 TVD, 1877.70 N, 1803.76 E) - Point	0.00	0.00	11,723.00	1,898.49	1,842.61	14,458,412.53	1,731,888.11	39.81191722	-80.67426796
Ten High 1N-20HU LP 5 - plan misses target center by 0.61usft at 12906.08usft MD (11723.40 TVD, 1898.26 N, 1792.20 E) - Point	0.00	0.00	11,723.00	1,898.49	1,792.61	14,458,412.53	1,731,838.10	39.81191772	-80.67444602

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,100.00	1,100.00	0.00	0.00	KOP Begin 2°/100' build	
1,250.00	1,249.93	-3.87	0.68	Begin 3.00° tangent	
1,450.00	1,449.66	-14.17	2.50	Begin 2°/100' drop/turn	
1,573.64	1,573.19	-18.27	5.02	Begin 2.00° tangent	
3,073.64	3,072.28	-40.40	52.46	Begin 2°/100' drop	
3,173.64	3,172.26	-41.13	54.04	Begin vertical hold	
7,501.38	7,500.00	-41.13	54.04	Begin 3°/100' build	
8,334.71	8,307.14	78.60	187.02	Begin 3°/100' build/turn	
8,785.47	8,693.94	207.13	377.04	Begin 36.68° tangent	
11,542.17	10,904.64	992.37	1,824.66	Begin 6°/100' build/turn	
12,283.94	11,494.27	1,377.11	1,990.25	Begin 8°/100' build/turn	
12,906.09	11,723.40	1,898.27	1,792.20	Begin 91.00° lateral	
22,873.58	11,549.50	10,558.48	-3,139.47	PBHL/TD 22873.58 MD/11549.50 TVD	

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4705102021 mos



**Well Site Safety Plan**  
**Tug Hill Operating, LLC**

*ju*  
*10/24/19*

Well Name: Ten High 1N-20HU

Pad Location: Ten High

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

NORTHING -4,406,354.29

EASTING -527,318.92

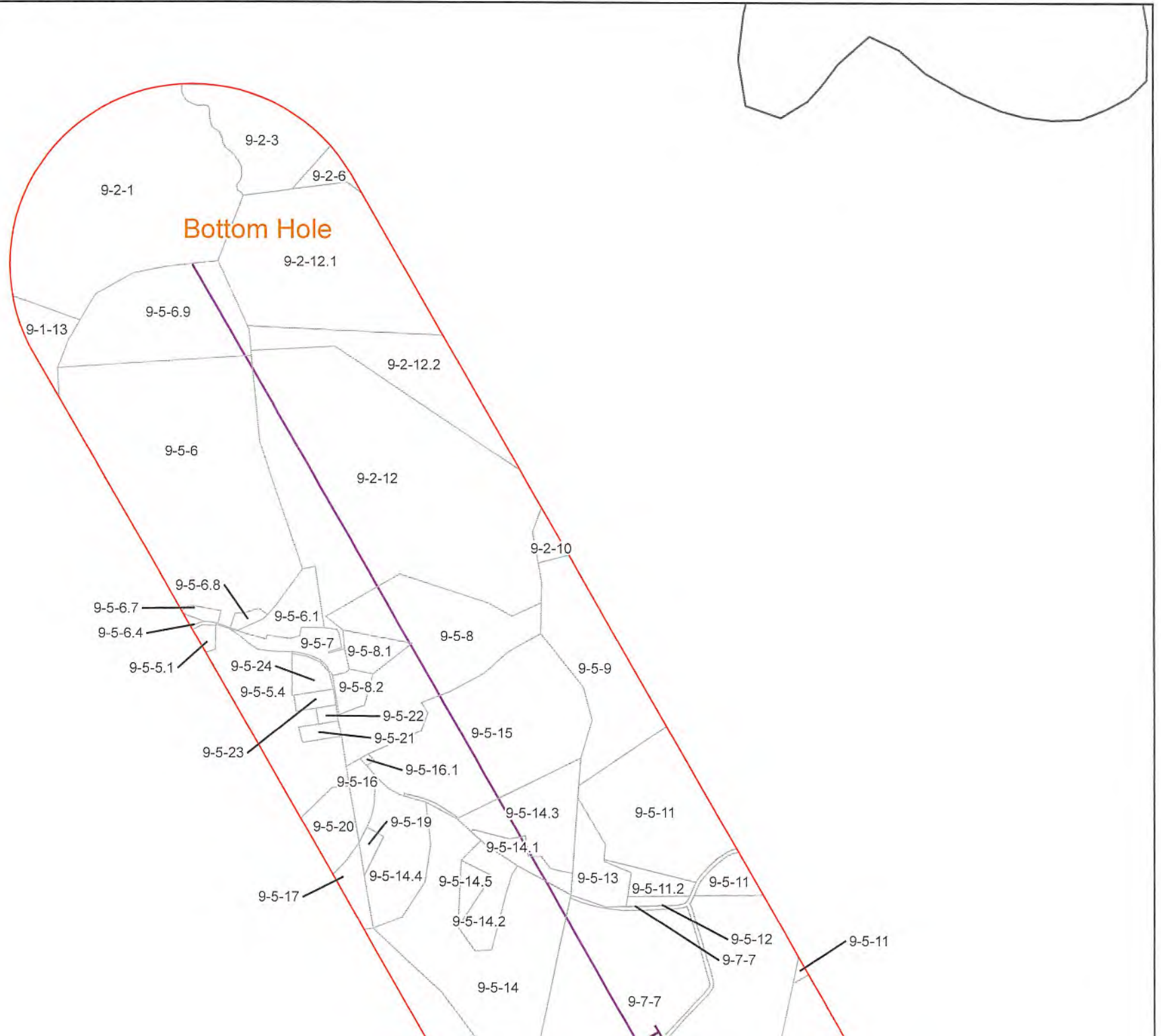
September 2019

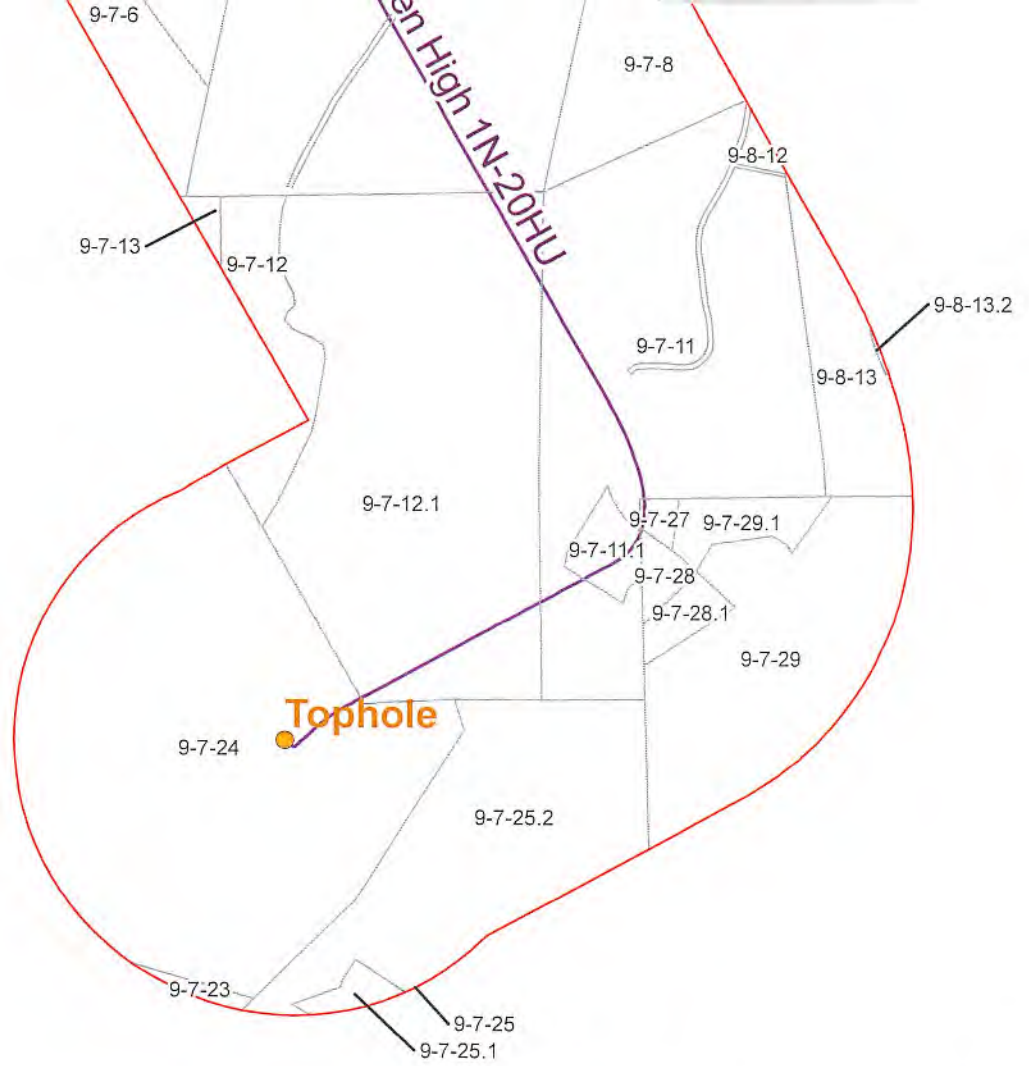
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# Ten High 1N-20HU





Coordinate System: NAD 1983 UTM Zone 17N  
 Projection: Transverse Mercator  
 Datum: North American 1983  
 False Easting: 1,500,000.0000  
 False Northing: 0.0000  
 Central Meridian: -81.0000  
 Scale Factor: 0.9996  
 Latitude of Origin: 0.0000  
 Units: Feet US

**CONFIDENTIAL**



-  1500 Foot Buffer
-  Well of Interest



## Ten High 1N-20HU

### Operators within 1500 Feet of Well Borehole

**Offset Operators within 1500'  
Ten High 1N - 20HU**

County	District	Parcel	Owner	Address
MARSHALL	MEADE	9-1-13	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-2-1	CHEVRON USA INC	700 Cherrington Pkwy Moon, PA 15108
MARSHALL	MEADE	9-2-3	CHEVRON USA INC	700 Cherrington Pkwy Moon, PA 15108
MARSHALL	MEADE	9-2-6	CHEVRON USA INC	700 Cherrington Pkwy Moon, PA 15108
MARSHALL	MEADE	9-2-10	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-2-12	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-2-12.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-2-12.2	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-5.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-5.4	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-6	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-6.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-6.4	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-6.7	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-6.8	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107

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MARSHALL	MEADE	9-5-6.9	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-7	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-8	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-8.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-8.2	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-9	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-11	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-11.2	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-12	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-13	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-14	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-14.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-14.2	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-14.3	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-14.4	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107

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MARSHALL	MEADE	9-5-14.5	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-15	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-16	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-16.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-17	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-19	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-20	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-21	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-22	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-23	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-5-24	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-6	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-7	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-8	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-11	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107

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MARSHALL	MEADE	9-7-11.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-12	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-12.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-13	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-23	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-24	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-25	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-25.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-25.2	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-27	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-28	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-28.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-29	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-7-29.1	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107
MARSHALL	MEADE	9-8-12	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107

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MARSHALL	MEADE	9-8-13	LARRY LEE CONKLE SR	154 Conkle Drive Glen Easton, WV 26039
MARSHALL	MEADE	9-8-13.2	TH EXPLORATION LLC	1320 S. University Drive Suite 500 Fort Worth, TX 76107

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**TEN HIGH 1N LEASE  
UTICA UNIT - 621.36 AC±  
WELL 20HU  
TUG HILL OPERATING**

T.H. LATITUDE 39°50'00"  
B.H. LATITUDE 39°52'30"

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)  
NAD'83 S.P.C.(FT) N. 478,129.43 E. 1,636,785.22  
NAD'83 GEO. LAT-(N) 39.806722 LONG-(W) 80.680854  
NAD'83 UTM (M) N. 4,406,354.29 E. 527,318.92  
**LANDING POINT**  
NAD'83 S.P.C.(FT) N. 479,998.1 E. 1,638,589.5  
NAD'83 GEO. LAT-(N) 39.811917 LONG-(W) 80.674447  
NAD'83 UTM (M) N. 4,406,932.9 E. 527,865.2  
**BOTTOM HOLE**  
NAD'83 S.P.C.(FT) N. 489,742.5 E. 1,633,801.6  
NAD'83 GEO. LAT-(N) 39.835748 LONG-(W) 80.691903  
NAD'83 UTM (M) N. 4,409,572.5 E. 526,362.0

T.H. LONGITUDE 80°40'00"  
B.H. LONGITUDE 80°40'00"

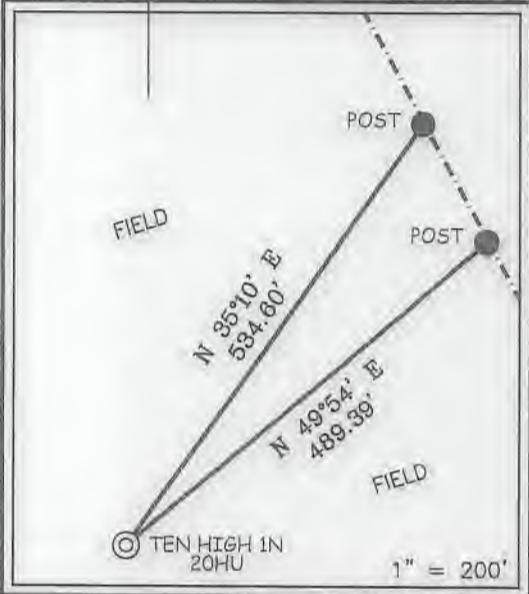
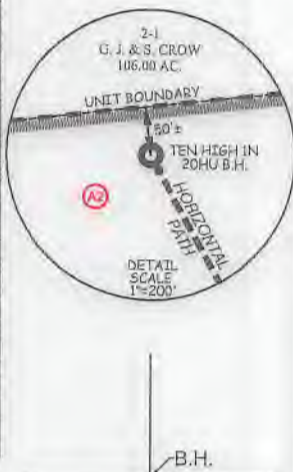
TAG	SURFACE OWNER	PARCEL	ACRES
A	LAWRENCE & SHIRLEY CONKLE ESTS	9-7-24	139.79
B	THOMAS R. & KIMBERLY WHITFIELD	9-7-25.2	76.40
C	ROBERT G. HUBBS & SCARLETTE E. OTTE	9-7-12.1	86.363
D	MARK H. FOX	9-7-11	75.37
E	NATHAN WILLIAMS	9-7-28.1	2.768
F	W.V. DEPT. OF HIGHWAYS	9-7-11.1	3.63
G	VICTOR & CLAIRE CAMERON	9-7-28	1.983
H	DARLA JO COX, ET AL.	9-7-29	85.540
I	CAROL J. ANDERSON - LIFE	9-7-29.1	5.004
J	CAROL J. ANDERSON - LIFE	9-7-27	1.006
K	RONALD MOORE, ET UX	9-7-12	16.587
L	ROBERT HENDERSON, ET AL.	9-7-8	48.00
M	RONALD MOORE, ET UX	9-7-13	51.49
N	ROBERT G. HUBBS & SCARLETTE E. OTTE	9-7-7	108.61
O	TERESA L. HORNER WITH JERRY G. & CAROLYN K. FLETCHER (LIFE ESTATE)	9-7-6	103.30
P	DAVID L. HOLMES, ET UX	9-5-14	37.345
Q	DAVID L. HOLMES, ET UX	9-5-14.2	4.995
R	DAVID L. HOLMES, ET UX	9-5-14.5	1.66
S	SHELLY ANN JORDAN, GEORGIA JORDAN LIFE ESTATE	9-5-13	5.51
T	SAVANNA WEST, ET AL.	9-5-14.1	2.819
U	MARK H. FOX, ET UX	9-5-14.3	10.714
V	BETTY R. OTT	9-5-14.4	10.501
W	BETTY R. OTT	9-5-19	0.933
X	CARLA SUE CROW	9-5-17	6.341
Y	KELLY WILSON WITH DONLD E. LEACH (LIFE ESTATE)	9-5-18	5.807
Z	KELLY WILSON WITH DONLD E. LEACH (LIFE ESTATE)	9-5-20	6.924
AA	LARRY L. CONKLE, JR.	9-5-16	2.365
BB	MARK H. FOX, ET UX	9-5-15	36.533
CC	SCOTT A. HOSTUTLER	9-5-16.1	0.142
DD	MICHAEL JOSEPH SNYDER	9-5-5.4	64.00
EE	RALPH E. WELLMAN, ET UX	9-5-21	1.00
FF	RALPH E. WELLMAN, ET UX	9-5-22	0.5
GG	RALPH E. WELLMAN, ET UX	9-5-23	1.00
HH	ALVIE & MARCELLA DARRAH	9-5-24	1.986
II	MISTY CROW WITH ROBERT & ELSIE WHETZEL (LIFE ESTATE)	9-5-8.2	1.973
JJ	YEATER ADDITION TO BOWMAN RIDGE CEMETERY FROM PLAT OF SURVEY DB 509-374	NOT ASSD	NOT ASSD
KK	SCOTT A. HOSTUTLER	9-5-8	26.752
LL	ISAAC MCKINNEY, ET UX	9-5-8.1	2.875
MM	ME CHURCH	9-5-7	81.5 POLES (6 AC ASSD)
NN	M E CHURCH	NOT ASSD	NOT ASSD
OO	TRUSTEES OF M E CHURCH	NOT ASSD	1.00
PP	MICHAEL JOSEPH SNYDER	9-5-5	35.02
QQ	DAVID M. TOLER, ET UX	9-5-5.1	0.985
RR	NANCY L. SNYDER	9-5-6.6	0.420
SS	NANCY L. SNYDER	9-5-6.7	0.678
TT	NANCY L. SNYDER	9-5-6.8	0.691
UU	JON B. CRAWFORD	9-5-6.1	4.679
VV	HARRY J. CRAWFORD, ET UX (LIFE ESTATE)	9-2-12	80.718
WW	MICHAEL JOSEPH SNYDER	9-5-6.2	2.82
XX	NANCY L. SNYDER	9-5-6.4	0.694
YY	NANCY L. SNYDER (LIFE ESTATE)	9-5-6	82.858
ZZ	CNX LAND LLC	9-2-12.2	31.392
A0	CNX LAND RESOURCES INC.	9-2-12.1	36.00
A1	ROBERT A. & CHERYL L. WILLIAMS	9-1-13	80.897
A2	CNX LAND LLC	9-5-6.9	22.392

MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
9-1-13.1	BURDETTE L. BEUCKE	14.256
9-1-13.4	MACK L. CROW	4.273
9-1-13.5	MACK L. CROW	2.491
9-1-13.6	GERALD E. LOGSDON, ET UX	7.621
9-1-13.7	SHARON D. TUCKER	7.817
9-1-14	ALICIA JANE MARTIN	2.4602
9-1-14.1	ALICE J. & DOUGLAS J. MARTIN	0.905
9-5-5.2	PETER PARKER	0.873
9-5-5.3	MICHAEL J. & NANCY L. SNYDER	1.870
9-5-6.3	DEUTSCHE BANK NATIONAL TRUST CO.	1.391
9-5-6.3	LINDA GORBY DELBERT	1.087
9-5-14.1	SAVANNA WEST, ET AL.	2.819
9-5-14.3	MARK FOX, ET UX	10.714
9-5-24	ALVIE & MARCELLA DARRAH	1.986
9-7-11.1	WV DEPT OF HIGHWAYS	3.63
9-7-25	THOMAS R. & KIMBERLY WHITFIELD	0.83
9-7-25.1	THOMAS R. & KIMBERLY WHITFIELD	4.23
9-7-27	CAROL J. ANDERSON - LIFE	1.005
9-7-28	VICTOR & CLAIRE CAMERON	1.983
9-7-28.1	NATHAN WILLIAMS	2.768
9-7-29.1	CAROL J. ANDERSON - LIFE	5.004
9-11-7.1	BRENDA J. WHETZEL	17.812
9-11-8	WNEK FAMILY IRREVOCABLE TRUST	30.10
9-12-4	THOMAS R. & KIMBERLY WHITFIELD	54.02

**NOTES ON SURVEY**

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS > 2500 SQ. FT. WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
- PROPOSED LATERAL OR TOP HOLE OF TEN HIGH 1N-20HU (47-051-02021) IS WITHIN 3000' OF THE TOP HOLES OR LATERALS OF THE FOLLOWING:  
HEAVEN HILL 3-8HU (47-051-01967), PROPOSED HEAVEN HILL 3N-16HU, TEN HIGH 1N-11HU (47-051-01960), TEN HIGH 1N-12HU (47-051-01961), TEN HIGH 1N-13HU (47-051-01965), TEN HIGH 1S-14HU (47-051-01966), TEN HIGH 1S-15HU (47-051-02027), TEN HIGH 1S-16HU (47-051-02028), TEN HIGH 1S-17HU (47-051-02033), PROPOSED HUDSON S-11HU, PROPOSED HUDSON S-12HU.

**REFERENCES**



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26351 | 304.462.6634  
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952  
254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
slsvv.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 18  
REVISED 02/20/19, 03/09/19, 09/19/19, 10/23/19, 11/12/19, 07/08/20  
OPERATORS WELL NO. TEN HIGH 1N-20HU  
API WELL NO. 47 - 051 - 02021 MOD  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8655P20HUR8.dwg  
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'  
TEN HIGH 1N-20HU Rev8

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

WELL TYPE: OIL  GAS  INJECTION  WASTE DISPOSAL  IF "GAS" PRODUCTION  STORAGE  DEEP  SHALLOW   
LOCATION: GROUND = 1,319.90' ELEVATION PROPOSED = 1,310.06' WATERSHED MIDDLE BOWMAN RUN OF FISH CREEK (HUC 10)  
DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'  
SURFACE OWNER LAWRENCE & SHIRLEY CONKLE ESTS ACREAGE 139.79±  
ROYALTY OWNER ANDY PAUL & JACKIE KUHN, ET AL - SEE ADDITIONAL SHEETS ACREAGE 139.79±  
PROPOSED WORK: LEASE NO. SEE ADDITIONAL SHEETS  
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 POINT PLEASANT  
ESTIMATED DEPTH TVD:11,962' / TMD: 22,874'

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

**TEN HIGH 1N LEASE  
UTICA UNIT - 621.36 AC±  
WELL 20HU  
TUG HILL OPERATING**

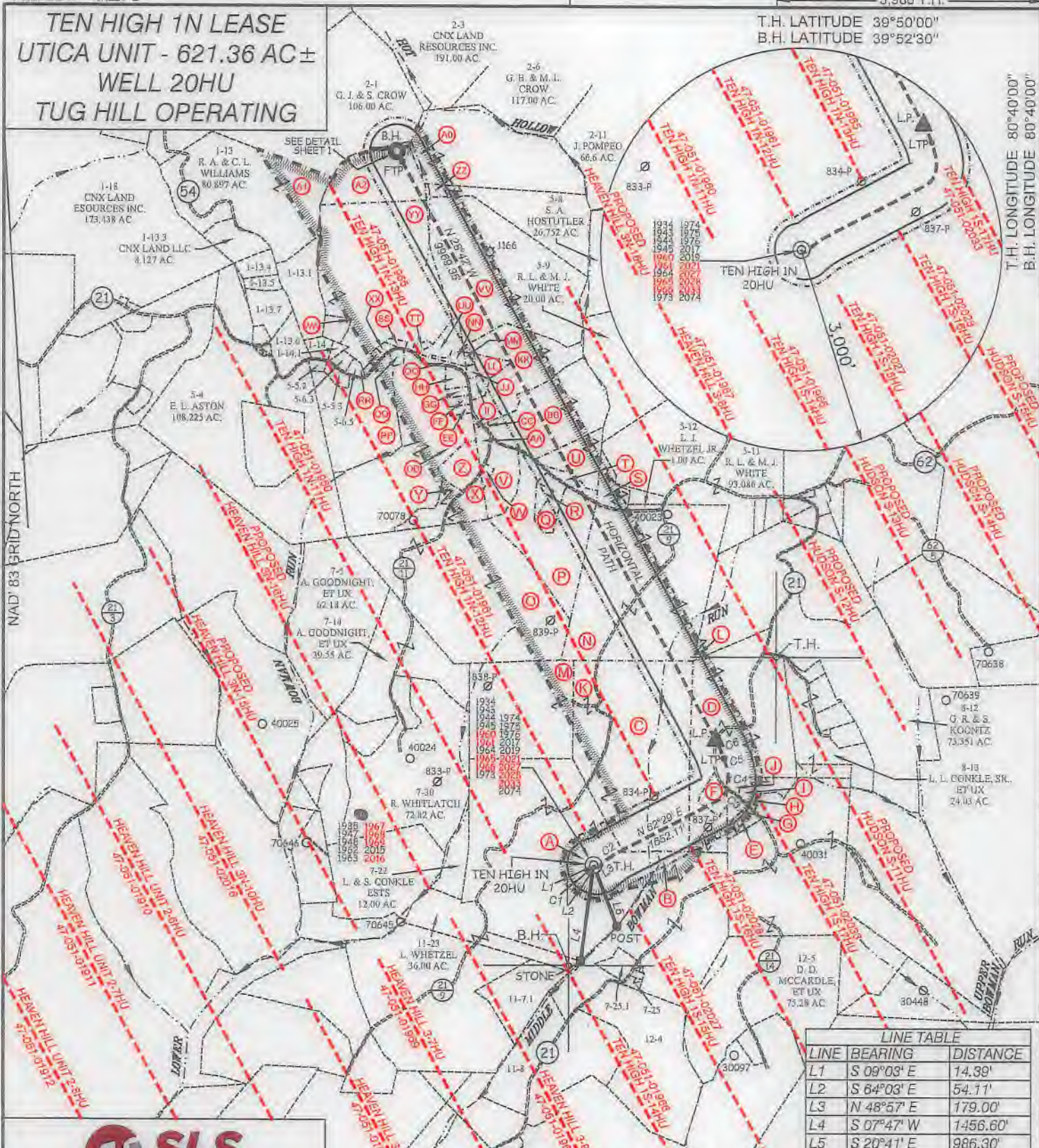
T.H. LATITUDE 39°50'00"  
B.H. LATITUDE 39°52'30"

T.H. LONGITUDE 80°40'00"  
B.H. LONGITUDE 80°40'00"

NAD'83 GRID NORTH

9,694' T.H.

14,298' B.H.



LINE TABLE		
LINE	BEARING	DISTANCE
L1	S 09°03' E	14.39'
L2	S 64°03' E	54.11'
L3	N 48°57' E	179.00'
L4	S 07°47' W	1456.60'
L5	S 20°41' E	986.30'

CURVE TABLE				
CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	4.93'	6.50'	S 30°36' E	4.81'
C2	229.95'	1045.84'	N 56°53' E	229.48'
C3	289.97'	316.45'	N 36°00' E	279.93'
C4	202.64'	529.31'	N 01°12' W	201.40'
C5	259.96'	1404.10'	N 16°40' W	259.59'
C6	252.07'	2109.73'	N 25°13' W	251.92'



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26031 | 304.462.6634  
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952  
254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
slsvw.com

P.S. 849 *C. Victor Moyers*

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

NAD'83 S.P.C.(FT) N. 478,129.43 E. 1,636,765.22  
NAD'83 GEO. LAT-(N) 39.806722 LONG-(W) 80.680854  
NAD'83 UTM (M) N. 4,406,354.29 E. 527,318.92

**LANDING POINT**

NAD'83 S.P.C.(FT) N. 479,998.1 E. 1,668,589.5  
NAD'83 GEO. LAT-(N) 39.811917 LONG-(W) 80.674447  
NAD'83 UTM (M) N. 4,406,832.9 E. 527,865.2

**BOTTOM HOLE**

NAD'83 S.P.C.(FT) N. 488,742.5 E. 1,633,801.6  
NAD'83 GEO. LAT-(N) 39.835748 LONG-(W) 80.691903  
NAD'83 UTM (M) N. 4,409,572.5 E. 526,362.0



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

**LEGEND**

- UNIT BOUNDARY
- LEASED TRACTS, INSIDE
- UNIT BOUNDARY
- SURFACE LINE
- PROPOSED UTICA
- WELL LATERAL
- 400' OFFSET LINE
- 500' OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- PROPOSED FIRST TAKE POINT
- PROPOSED LAST TAKE POINT
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- SURFACE OWNER (SEE TABLE)
- LEASE # (SEE ADDITIONAL SHEETS)

COUNTY NAME

PERMIT

SCALE 1" = 2000' FILE NO. 8655P20HUR6.dwg  
TEN HIGH 1N-20HU Rev8  
DATE JANUARY 19 20 18  
02/20/19, 03/09/19, 09/19/19,  
REVISED 10/23/19, 11/12/19, 07/06/20  
OPERATORS WELL NO. TEN HIGH 1N-20HU  
API WELL NO. 47 — 051 — 02021  
NO. STATE COUNTY PERMIT

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



MOD

WELL OPERATOR TUG HILL OPERATING, LLC  
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500  
FORT WORTH, TX 76107

DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 5400 D BIG TYLER ROAD  
CHARLESTON, WV 25313

TEN HIGH 1N LEASE  
 UTICA UNIT - 621.36 AC±  
 WELL 20HU  
 TUG HILL OPERATING



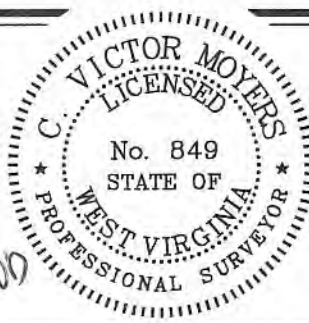
12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26351 | 304.462.5634  
 1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952  
 254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
 slswv.com

No.	Lease Name or No.	Tag	Parcel	Grantors, Lessors, etc.	Deed Book/Page
1	10*15662	A	9-7-24	LARRY LEE CONKLE, ET AL	863 354
2	10*15481	B	9-7-25.2	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
3	10*15501	C	9-7-12.1	RONALD AND EDNA MOORE, ET AL	661 449
4	10*47051.094.0	D	9-7-11	MARK H FOX	864 163
5	10*19183	E	9-7-28.1	EVELYN M WILLIAMS	720 180
6	10*19565	F	9-7-11.1	WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS	947 566
7	10*19143	G	9-7-28	VICTOR CAMERON CLAIRE CAMERON	872 171
8	10*15524	H	9-7-29	CAROL ANDERSON ET AL	901 563
9	10*15524	I	9-7-29.1	CAROL J ANDERSON ET AL	901 563
10	10*15524	J	9-7-27	CAROL J ANDERSON ET AL	901 563
11	10*15501	K	9-7-12	RONALD AND EDNA MOORE	661 449
12	10*26003	L	9-7-8	ROBERT HENDERSON AND DEBRA HENDERSON, HUSBAND & WIFE, AND BRADLEY HENDERSON	697 215
13	10*15501	M	9-7-13	RONALD AND EDNA MOORE	661 449
14	10*15503	N	9-7-7	ROBERT HUBBS	677 521
15	10*15500	O	9-7-6	JERRY FLETCHER AND CAROLYN FLETCHER, HUSBAND AND WIFE	661 154
16	10*15502	O	9-7-6	SHERWOOD YEATER	748 268
17	10*47051.075.0	P	9-5-14	DAVID L HOLMES AND TERRI L HOLMES	869 204
18	10*47051.075.0	Q	9-5-14.2	DAVID L HOLMES AND TERRI L HOLMES	869 204
19	10*47051.075.0	R	9-5-14.5	DAVID L HOLMES AND TERRI L HOLMES	869 204
20	10*26002	S	9-5-13	GEORGIA JORDAN LIFE ESTATE AND SHELY ANN JORDAN REMAINDERMAN	687 616
21	10*47051.156.0	T	9-5-14.1	MATTHEW RYAN WEST & SAVANNAH NICOLE WEST	876 98
22	10*19005	U	9-5-14.3	MARK H. FOX AND RETTA J. FOX, HIS WIFE	687 598
23	10*15506	V	9-5-14.4	BETTY R. OTT	687 604
24	10*15506	W	9-5-19	BETTY R. OTT	687 604
25	10*15481	X	9-5-17	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
26	10*15481	Y	9-5-18	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
27	10*15481	Z	9-5-20	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
28	10*19133	AA	9-5-16	JERRY L. RUSH, JR. AND JILL RUSH, HIS WIFE	700 239
29	10*19005	BB	9-5-15	MARK H. FOX AND RETTA J. FOX, HIS WIFE	687 598
30	10*19220	CC	9-5-16.1	SCOTT A HOSTUTLER	731 353
31	10*15481	DD	9-5-5.4	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
32	10*15481	EE	9-5-21	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
33	10*15482	FF	9-5-22	SUSAN NELSON, ET AL	908 203
34	10*15481	GG	9-5-23	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
35	10*15482	HH	9-5-24	SUSAN NELSON, ET AL	908 203
36	10*21734	II	9-5-8.2	ROBERT L WHETZEL AND ELSIE E WHETZEL	772 523
37	10*21731	JJ	NOT ASSD	BOWMAN UNITED METHODIST CHURCH, ET AL	867 110
38	10*19206	KK	9-5-8	SCOTT A HOSTUTLER	724 208
39	10*26006	LL	9-5-8.1	ISAAC L MCKINNEY AND YVINNE A MCKINNEY	701 472
40	10*15482	MM	9-5-7	SUSAN NELSON, ET AL	908 203
41	10*21731	NN	NOT ASSD	BOWMAN UNITED METHODIST CHURCH, ET AL	867 110
42	10*16058	OO	NOT ASSD	MATTIE RUTH JACKSON PRESCOTT, ET AL	908 231
43	10*15481	PP	9-5-5	DEAN P RIGBY AND SUSAN RIGBY, ET AL	908 197
44	10*15482	QQ	9-5-5.1	SUSAN NELSON, ET AL	908 203
45	10*16448	RR	9-5-6.6	RALPH L AND JUANITA L CRIM, ET AL	908 584
46	10*16448	SS	9-5-6.7	RALPH L AND JUANITA L CRIM, ET AL	908 584
47	10*16448	TT	9-5-6.8	RALPH L AND JUANITA L CRIM, ET AL	908 584
48	10*16448	UU	9-5-6.1	RALPH L AND JUANITA L CRIM, ET AL	908 584
49	10*26000	VV	9-2-12	HARRY J CRAWFORD AND DONNA JEAN CRAWFORD, LIFE ESTATE, ET AL	661 156
50	10*16448	WW	9-5-6.2	RALPH L AND JUANITA L CRIM, ET AL	908 584
51	10*16448	XX	9-5-6.4	RALPH L AND JUANITA L CRIM, ET AL	908 584
52	10*16448	YY	9-5-6	RALPH L AND JUANITA L CRIM, ET AL	908 584
53	10*26000	ZZ	9-2-12.2	HARRY J CRAWFORD AND DONNA JEAN CRAWFORD, LIFE ESTATE, ET AL	661 156
54	10*15482	A1	9-1-13	SUSAN NELSON, ET AL	908 203
55	10*16448	A2	9-5-6.9	RALPH L AND JUANITA L CRIM, ET AL	908 584

FILE NO. 8655P20HUR8.dwg  
 TEN HIGH 1N-20HU Rev8

DATE JANUARY 19, 20 18  
 02/20/19, 03/09/19, 09/19/19,  
 REVISED 10/23/19, 11/12/19, 07/08/20

OPERATORS WELL NO. TEN HIGH 1N-20HU  
 API WELL NO. 47 — 051 — 02021 MOD  
 STATE COUNTY PERMIT



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



P.S. 849 *C. Victor Moyers*

WELL OPERATOR TUG HILL OPERATING, LLC  
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500  
 FORT WORTH, TX 76107

DESIGNATED AGENT DIANNA STAMPER  
 ADDRESS CT CORPORATION SYSTEM  
 5400 D BIG TYLER ROAD  
 CHARLESTON, WV 25313

COUNTY NAME  
 PERMIT

470510202

WW-6A1  
(5/13)

Operator's Well No. Tug Hill 10-25-11U  
~~470510202~~ 1 MW

**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  
 Its: Permitting Specialist Appalachia Region

4705102021MOD

WW-6A1 Well Bore Tracts

Operator's Well No. Ten High 1N - 20HU

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*15662	9-7-24	A	LARRY LEE CONKLE	CHEVRON U.S.A. INC.	1/8+	863 354	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to Tug Hill Exploration LLC: 36/148	Chevron USA Inc to TH Exploration LLC: 906/409
10*15663	9-7-24	A	ROY A CONKLE SR AND LORIE A CONKLE	CHEVRON USA INC	1/8+	863 311	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to Tug Hill Exploration LLC: 36/148	Chevron USA Inc to TH Exploration LLC: 906/409
10*15664	9-7-24	A	TERESA A HUGHES	CHEVRON USA INC	1/8+	863 343	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to Tug Hill Exploration LLC: 36/148	Chevron USA Inc to TH Exploration LLC: 906/409
10*15666	9-7-24	A	BRENDA J WHETZEL	CHEVRON USA INC	1/8+	863 635	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to Tug Hill Exploration LLC: 36/148	Chevron USA Inc to TH Exploration LLC: 906/409
10*16049	9-7-24	A	DANNY SHAWN KERNS AND AMY LYNN KERNS	TH EXPLORATION LLC	1/8+	905 518	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16138	9-7-24	A	LARRY W KUHN AND VICKIE B KUHN, HUSBAND AND WIFE	TH EXPLORATION LLC	1/8+	905 522	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16139	9-7-24	A	HUBERT DEAN KUHN AND ANDREA KUHN	TH EXPLORATION LLC	1/8+	905 524	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16140	9-7-24	A	ANDY PAUL KUHN	TH EXPLORATION LLC	1/8+	905 526	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16141	9-7-24	A	HOWARD L KUHN AND MARY L KUHN	TH EXPLORATION LLC	1/8+	905 528	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16820	9-7-24	A	ROBERTA ANN GIBB AND DAVID S GIBB	TH EXPLORATION LLC	1/8+	919 237	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17365	9-7-24	A	MYSTI JOANNE GOODMAN	TH EXPLORATION LLC	1/8+	927 468	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17370	9-7-24	A	KELLY JUNE GOODMAN	TH EXPLORATION LLC	1/8+	927 470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18256	9-7-24	A	JEFFREY STEPHEN GOODMAN	TH EXPLORATION LLC	1/8+	929 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.3	9-7-24	A	HAZEL ARIZONA MOORE REYNOLDS	TH EXPLORATION LLC	1/8+	904 632	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.4	9-7-24	A	LLOYD D MOORE	TH EXPLORATION LLC	1/8+	904 459	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.5	9-7-24	A	DALE R MOORE	TH EXPLORATION LLC	1/8+	904 635	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.6	9-7-24	A	MARY I BURKHART	TH EXPLORATION LLC	1/8+	904 638	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.7	9-7-24	A	JEANNE V MELCHIORI	TH EXPLORATION LLC	1/8+	904 462	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.9	9-7-24	A	JAMES E HIMELRICK JR AND KAREN HIMELRICK	TH EXPLORATION LLC	1/8+	904 465	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.10	9-7-24	A	DEENA J PALOMO	TH EXPLORATION LLC	1/8+	905 470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.11	9-7-24	A	REGINA D FIGUEROA AND DAVID FIGUEROA	TH EXPLORATION LLC	1/8+	905 435	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.12	9-7-24	A	EARL D WELLMAN	TH EXPLORATION LLC	1/8+	905 432	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.295.13	9-7-24	A	THE DOLLYE F WOOD REVOCABLE TRUST BY NICHOLAS CHARLES WOOD AS TRUSTEE	TH EXPLORATION LLC	1/8+	904 641	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*15501	9-7-12.1	C	RONALD AND EDNA MOORE	TRIEnergy HOLDINGS, LLC	1/8+	661 449	TriEnergy Inc to AB Resources LLC: 20/252	TriEnergy Inc to TriEnergy Holdings LLC: 21/148	AB Resources LLC to Chief E&D and Radler 2000 LP: 24/319	Chief E&D LLC, Chief O&G LLC, Radler 2000 LP & Enerplus Resources USA Corp to Chevron USA Inc: 25/1 & 25/105	AB Resources LLC to Chevron USA Inc: 756/379	TriEnergy Holdings LLC & TriEnergy Inc to Chevron USA Inc: 28/356	Chevron USA Inc to TH Exploration LLC: 36/148 & 40/127	Memorandum of Agreement between Tug Hill Operating LLC and Chevron USA Inc: 960/409	











WW-6A1 Well Bore Tracts

Operator's Well No. Ten High 1N - 20HU

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10*16839	9-5-6.9	A2	JAMES B FOUNDS AND LYNN M MOWERY	TH EXPLORATION LLC	1/8+	921	73	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16863	9-5-6.9	A2	TINA MOORE	TH EXPLORATION LLC	1/8+	921	334	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16868	9-5-6.9	A2	MICHAEL W STORTS AND JESSICA M STORTS	TH EXPLORATION LLC	1/8+	921	504	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16879	9-5-6.9	A2	MARK E STORTS AND LESLEY A STORTS	TH EXPLORATION LLC	1/8+	921	501	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16880	9-5-6.9	A2	BEVERLY ANN STORTS	TH EXPLORATION LLC	1/8+	921	498	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16902	9-5-6.9	A2	MARY BARCAW DUKE	TH EXPLORATION LLC	1/8+	921	105	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16977	9-5-6.9	A2	JEREMY COCHENOUR	TH EXPLORATION LLC	1/8+	921	102	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16989	9-5-6.9	A2	BRITTANY RICHARDSON	TH EXPLORATION LLC	1/8+	921	376	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16991	9-5-6.9	A2	MARYELLEN FOUNDS AND LAUREN FOUNDS	TH EXPLORATION LLC	1/8+	921	79	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16996	9-5-6.9	A2	THOMAS RANKIN	TH EXPLORATION LLC	1/8+	917	75	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17198	9-5-6.9	A2	THOMAS G AND DIANE W BAYLESS	TH EXPLORATION LLC	1/8+	921	141	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17205	9-5-6.9	A2	SANDRA JEAN WILSON	TH EXPLORATION LLC	1/8+	921	524	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17274	9-5-6.9	A2	DAVID H WILSON	TH EXPLORATION LLC	1/8+	921	474	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17339	9-5-6.9	A2	JOSEPH W FOUNDS	TH EXPLORATION LLC	1/8+	921	76	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17416	9-5-6.9	A2	ANDREW M ORTIZ	TH EXPLORATION LLC	1/8+	921	346	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17438	9-5-6.9	A2	DENNIS M WILSON	TH EXPLORATION LLC	1/8+	921	476	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17440	9-5-6.9	A2	KENDRA WALISA	TH EXPLORATION LLC	1/8+	927	484	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17441	9-5-6.9	A2	RALPH J WILSON	TH EXPLORATION LLC	1/8+	921	522	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17442	9-5-6.9	A2	SHANE ALLEN AND MENDY JEAN ALLEN	TH EXPLORATION LLC	1/8+	921	134	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17443	9-5-6.9	A2	MICHELLE MORROW-BACK	TH EXPLORATION LLC	1/8+	921	337	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17444	9-5-6.9	A2	KELLY FOUNDS	TH EXPLORATION LLC	1/8+	921	99	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17449	9-5-6.9	A2	CAMPBELL	TH EXPLORATION LLC	1/8+	921	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17483	9-5-6.9	A2	PHYLLIS J BLAKE	TH EXPLORATION LLC	1/8+	921	359	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17483	9-5-6.9	A2	RICHARD I PYLE	TH EXPLORATION LLC	1/8+	921	359	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17538	9-5-6.9	A2	CHERYL RANKIN-KING	TH EXPLORATION LLC	1/8+	952	160	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17552	9-5-6.9	A2	JOHN BEVACQUA AND PATRICIA A BEVACQUA	TH EXPLORATION LLC	1/8+	921	144	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17554	9-5-6.9	A2	MICHAEL T RANKIN	TH EXPLORATION LLC	1/8+	921	361	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17561	9-5-6.9	A2	ROGER L TYRRELL AND KATHRYN L TYRRELL	TH EXPLORATION LLC	1/8+	927	24	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17589	9-5-6.9	A2	MARY CHRISTINE MCKENNA	TH EXPLORATION LLC	1/8+	921	332	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18021	9-5-6.9	A2	CHRISTOPHER A HANIFAN AND JACKIE F HANIFAN	TH EXPLORATION LLC	1/8+	927	267	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18022	9-5-6.9	A2	DALE P WARD AND CYNTHIA J WARD	TH EXPLORATION LLC	1/8+	927	264	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19693	9-5-6.9	A2	MARIO R FUNARI	TH EXPLORATION LLC	1/8+	936	145	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19695.1	9-5-6.9	A2	GENERAL RECEIVER OF MARSHALL COUNTY ATTN: BERNIE TWIGG	TH EXPLORATION LLC	1/8+	944	333	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21702	9-5-6.9	A2	NANCY L SNYDER	CHEVRON USA INC	1/8+	865	191	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Chevron USA Inc to TH Exploration LLC: 42/435



4705102021mob

**MEMORANDUM OF AGREEMENT**

This Memorandum of Agreement is entered into this 16<sup>th</sup> day of February, 2018, between **TUG HILL OPERATING, LLC (THQ)**, a Texas limited liability company, whose address is 1320 S. University Blvd., Suite 500, Fort Worth, TX 76107 and **CHEVRON U.S.A., INC. (Chevron)**, a Pennsylvania corporation, whose address is 700 Cherrington Parkway, Coraopolis, PA 15108.

**PARTIES AND AGREEMENT REFERENCE:** THQ and Chevron entered into a letter agreement ("Letter Agreement") dated February 16<sup>th</sup>, 2018 (the "Commencement Date") outlining pursuit of definitive agreements to allow THQ the right to permit, drill, extract, produce and market oil and gas from those certain oil and gas interests controlled by Chevron in the Meade District of Marshall County, West Virginia, as more fully described in Exhibit A attached hereto, made a part hereof, and incorporated herein by reference.

1. **TERM:** The rights granted in the Letter Agreement will terminate upon the earlier of (i) one hundred eighty (180) days from the Commencement Date, (ii) Chevron's revocation of the rights granted in the Letter Agreement, or (iii) the parties entering into the definitive agreement described in the Letter Agreement. Upon termination of the Letter Agreement under subsection (i) or (ii) of the immediately preceding sentence, THQ will record a surrender of this Memorandum and withdraw any related well work permit requests.

2. **MEMORANDUM FOR RECORDING PURPOSES ONLY:** This Memorandum is for recording purposes only and does not supplement or supersede the parties' respective rights set forth in the Letter Agreement or other agreements.

IN WITNESS WHEREOF, the parties have signed their names hereto as of the date first above written.

**Tug Hill Operating, LLC**

  
By: Sean Willis  
Its: VP, Engineering &  
Development Manager - Appalachia

**Chevron U.S.A., Inc.**

  
By: William E. Korns  
Its: Attorney-in-Fact

Marshall County  
Jan Pest, Clerk  
Instrument 1436705  
02/16/2018 @ 02:16:57 PM  
AGREEMENT  
Book 960 @ Page 409  
Pages Recorded 2  
Recording Cost \$ 11.00

STATE OF WEST VIRGINIA                   §  
   §  
COUNTY OF MARSHALL                   §

**ASSIGNMENT AND BILL OF SALE**

This ASSIGNMENT AND BILL OF SALE (this "Assignment") dated as of February 7, 2019 (the "Signing Date"), but effective from and after 7:00 a.m., Eastern Standard Time on February 1, 2019 (the "Effective Date"), is made by Chevron U.S.A. Inc., a Pennsylvania corporation, with an address at 700 Cherrington Parkway, Coraopolis, PA 15108 ("Chevron" or "Assignor" ) to TH Exploration II, LLC and TH Exploration, LLC, Texas limited liability companies, with an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (collectively "Assignee") and is accepted by Assignee upon the following terms and conditions.

**RECITALS**

- A. Assignor desires to sell, convey, transfer, assign and deliver to Assignee Assignor's Crawford 1 well and certain related assets, including certain leasehold interests, located in Marshall County, West Virginia.
- B. Through an Acreage Trade Agreement to be executed contemporaneously with this Assignment, Assignor desires to transfer, convey and assign to Assignee certain of Assignor's oil and gas leasehold interests located in Marshall County, West Virginia in exchange for the transfer, conveyance and assignment to Assignor by Assignee certain of Assignee's oil and gas leasehold interests located in Marshall County, West Virginia.
- C. In consideration of the mutual promises set out in this Assignment, including execution of the Acreage Trade Agreement, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to be bound by the terms of this Assignment.

**1. DEFINITIONS**

1.1 **Definitions.** As used in this Assignment, these words and expressions have the following meanings:

"Acreage Trade Agreement" means that certain Acreage Trade Agreement by and between Chevron U.S.A. Inc. and TH Exploration, LLC with an Effective Date of February 1, 2019 to be contemporaneously executed with this Assignment.

"Act" has the meaning given to such term in Section 9.1(C).

"Affiliate" means any legal entity which controls, is controlled by, or is under common control with, another legal entity. An entity is deemed to "control" another if it owns directly or indirectly at least fifty percent of either of the following: (A) the shares entitled to vote at a general election of directors of such

STATE OF WEST VIRGINIA  
COUNTY OF MARSHALL

§  
§  
§

**COPY**

4705102021MOD

**MEMORANDUM OF ASSIGNMENT OF OIL AND GAS LEASES**

This **MEMORANDUM OF ASSIGNMENT OF OIL AND GAS LEASES** ("Memorandum") dated as of September 7th, 2018 (the "Effective Date"), is made by and between **Chevron U.S.A. Inc.**, a Pennsylvania corporation, with an address at 700 Cherrington Parkway, Coraopolis, PA 15108 ("Chevron" or "Assignor") and **TH Exploration, LLC**, Texas limited liability company, with an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 ("Assignee"). Chevron and Assignee are each referred to herein as a "Party" and collectively as the "Parties." Capitalized terms used but not defined herein shall have the meaning ascribed to those terms in that certain Assignment of Oil and Gas Leases between the Parties dated September 7th, 2018 ("Assignment").

- A. Notice is hereby given that the Parties have entered into the Assignment, pursuant to which Chevron assigned to Assignee all of Assignor's right, title, and interest in and to those certain Leases situated in Marshall County, West Virginia, less and except certain identified portions, as described in Exhibit "A", attached hereto and made a part hereof.
- B. Chevron does covenant, promise and agree, to and with the Assignee, its respective successors and assigns, to forever specially warrant and defend the title to the Leases or portions thereof included under the Assignment and this Memorandum, unto the Assignee and its respective successors and assigns, against the lawful claims of Chevron, and all persons claiming, or to claim, the same or any part thereof, by, through or under Chevron.
- C. Preparation of this Memorandum has been a joint effort of the Parties and it must not be construed more severely against any of the Parties than against any other.
- D. This Memorandum is subject to and expressly incorporates the terms of the Assignment. The Assignment will govern to the extent of any conflict between the terms of this Memorandum and the Assignment.
- E. In consideration of the mutual promises set out in this Assignment, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to be bound by the terms of this Assignment.

IN WITNESS WHEREOF, this Memorandum is executed this 7th day of September, 2018.

Marshall County  
Jan Pest, Clerk  
Instrument 1445509  
09/11/2018 @ 02:17:18 PM  
ASSIGNMENTS  
Book 42 @ Page 435  
Pages Recorded 7  
Recording Cost \$ 13.00