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west virginia department of environmental protection

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

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

Tuesday, April 28, 2020  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit Modification Approval for OLD CROW N-19H  
47-051-02270-00-00

**Modified Producing Formation from Utica to Marcellus in so doing well is now a shallow well**

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: OLD CROW N-19HU  
Farm Name: DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO  
U.S. WELL NUMBER: 47-051-02270-00-00  
Horizontal 6A New Drill  
Date Modification Issued: April 28, 2020

Promoting a healthy environment.

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

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Franklin Powhatan Point 7  
Operator ID County District Quadrangle

2) Operator's Well Number: Old Crow N-19HU Well Pad Name: Old Crow

3) Farm Name/Surface Owner: Donna Yoho Public Road Access: Rines Ridge Road (County Route 76)

4) Elevation, current ground: 1286' Elevation, proposed post-construction: 1264.99'

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

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):

Marcellus is the target formation at a depth of 6576' - 6627', thickness of 51' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6727'

9) Formation at Total Vertical Depth: ~~Onondaga~~ Onondaga

10) Proposed Total Measured Depth: 21,418'

11) Proposed Horizontal Leg Length: 13,640.37'

12) Approximate Fresh Water Strata Depths: 70'; 912'

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

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 814' and Pittsburgh Coal - 906'

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

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

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

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18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<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 <sup>3</sup> (CTS) ✖
Fresh Water	20"	NEW	J55	133#	991'	991'	1600ft <sup>3</sup> (CTS)
Coal	20"	NEW	J55	133#	991'	991'	1600ft <sup>3</sup> (CTS)
Intermediate	13 3/8"	NEW	J55	54.5#	2,893'	2,893'	2250ft <sup>3</sup> (CTS)
Production	5 1/2"	NEW	P110	20#	21,418'	21,418'	6765ft <sup>3</sup> (CTS)
Tubing	2 3/8"	NEW	N80	4.7#	7,679'		
Liners							

<b>TYPE</b>	<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	20"	26"	.635	3,060	2,448	SEE #24	1.2
Coal	20"	26"	.635	3,060	2,448	SEE #24	1.2
Intermediate	13 3/8"	17 1/2"	.38	2,730	2,184	SEE #24	1.2
Production	5 1/2"	8 7/8" _ 8 3/4"	.361	12,640	10,112	SEE #24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

**PACKERS**

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

*JM*  
*3/14/2017*

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

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

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

Well to completed with approximately 34,095,000 lb. proppant and 527,134 barrels of water. Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 19.18 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.64 acres

23) Describe centralizer placement for each casing string:

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

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

\*See attachment

25) Proposed borehole conditioning procedures:

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

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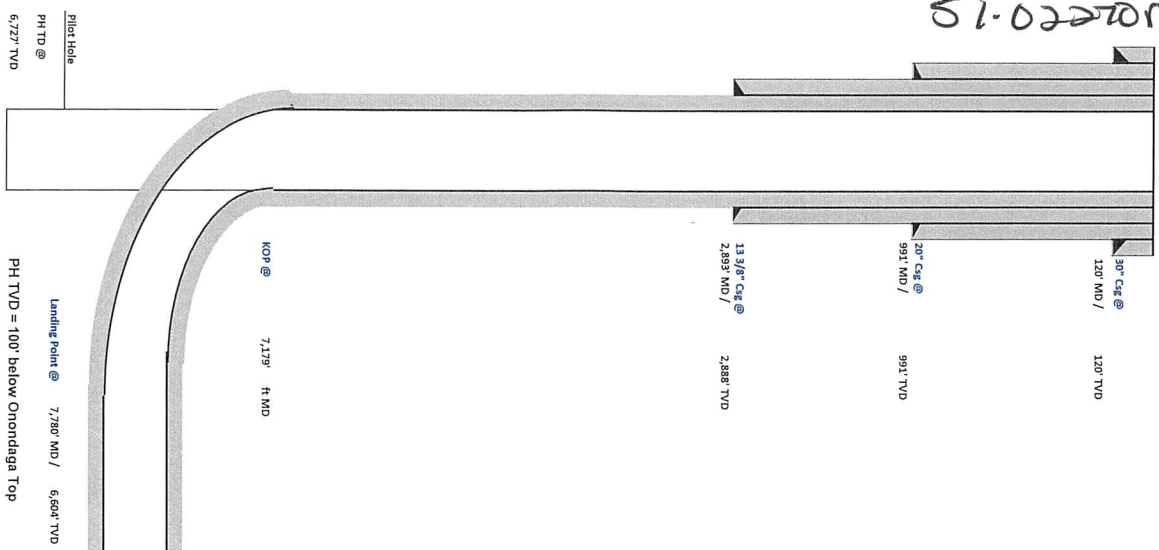
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\*Note: Attach additional sheets as needed.



0102000015

WELL NAME:	Old Crow N-19NU RD (3HM)	COUNTY:	Marshall
STATE:	WV		
DISTRICT:	Franklin	GL Elev:	1,265'
DF Elev:	1,291'		
TD:	21,418'		
TH latitude:	39.77845193		
TH longitude:	-80.76298617		
BH latitude:	39.818532		
BH longitude:	-80.787226		



FORMATION TOPS	Depth TVD
Deepest Fresh Water	912
Sewickley Coal	814
Pittsburgh Coal	906
Big Lime	2103
Walr	2457
Berea	2652
Gordon	2997
Rhinestreet	5970
Genevo/Burkett	6460
Tully	6495
Hamilton	6530
Marcellus	6576
Landing Depth	6604
Onondaga	6627
Pilot Hole Depth	6727

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	26	20	991'	991'	54.5	J55	Surface
Intermediate 1	17 1/2	13 3/8	2,893'	2,888'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	21,418'	6,366'	20	CYP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Sacks	Class	Density	Fluid Type	Controller Name	
338	A	15.6	Air	None	
1,725	A	15.6	Air	3 Centralizers at equal distance	
2,253	A	15	Air	1 Centralizer every other ft	
6,134	A	14.5	Air / SOBIM	1 every other joint in lateral; 1 per joint in curve; 1 every other ft to s/c	

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*Handwritten signature*

Pilot Hole @ 6,727' TVD  
PH TD @ 21,418' ft MD  
Landing Point @ 7,780' MD / 6,604' TVD  
PH TVD = 100' below Onondaga Top  
Lateral TD @ 6,366' ft MD



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

**Old Crow N-19HU RD (3HM)**

**Casing**

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	20"	J55	26"	991'	CTS
Intermediate	13 3/8"	J55	17 1/2"	2,893'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	21,418'	CTS

**Cement**

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

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**Well:** Old Crow N-03 HM (N-19 HU RD slot E)  
**Site:** Old Crow Pad  
**Project:** Marshall County, West Virginia.  
**Design:** N-03 rev3

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+NLS	+E/W	Dleg	TFace	V/Sect	Annotation
1	3045.00	0.31	182.47	3048.31	-1.79	-3.62	0.00	0.000	0.00	S/T Begin 3 1/100' build/turm
2	4459.06	41.99	41.36	4338.38	487.13	33.76	3.00	-178.122	426.58	Begin 91.98° tangent
3	7179.20	41.99	4.36	6359.70	2301.71	177.12	0.00	0.000	2010.35	Begin 8 1/100' build/turm
4	7307.79	50.00	355.35	6447.15	2393.94	171.16	8.00	-43.203	2094.15	Begin 10 1/100' build/turm
5	7779.84	91.00	329.72	6604.00	2801.26	29.65	10.00	-36.107	2523.09	Begin 91.00° lateral
6	21417.64	91.00	329.72	6366.00	14577.18	-6844.98	0.00	0.000	6104.28	PBHL/TD 21417.64 MD/6366.00 TVD

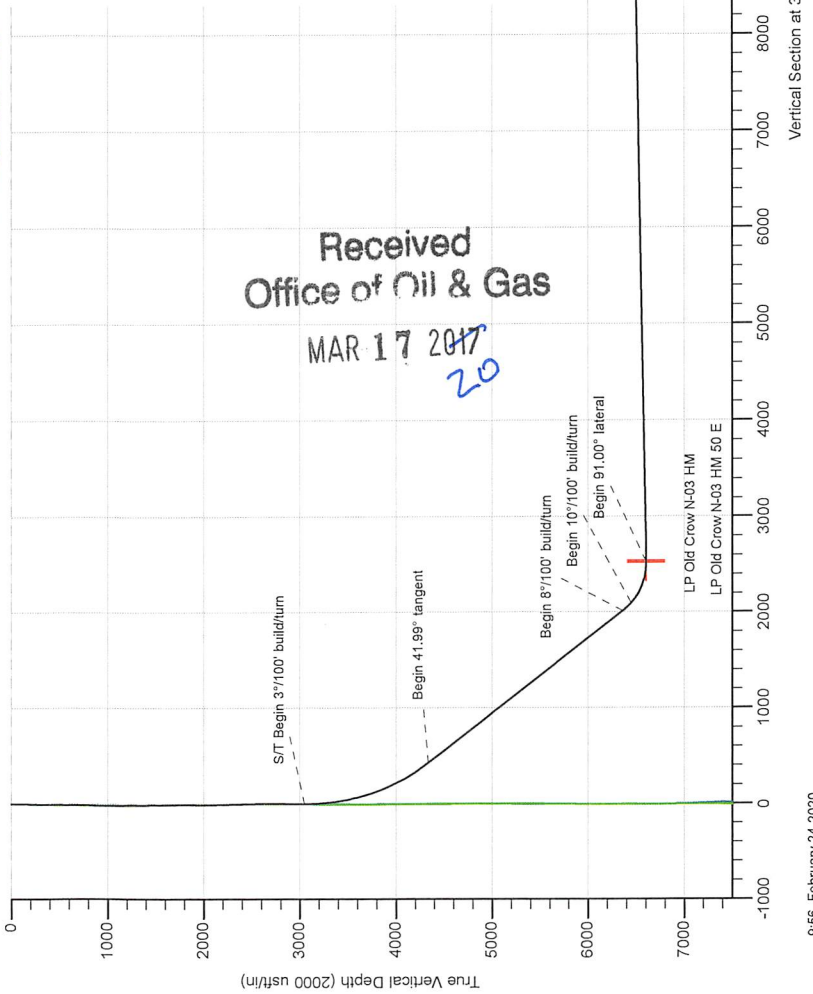
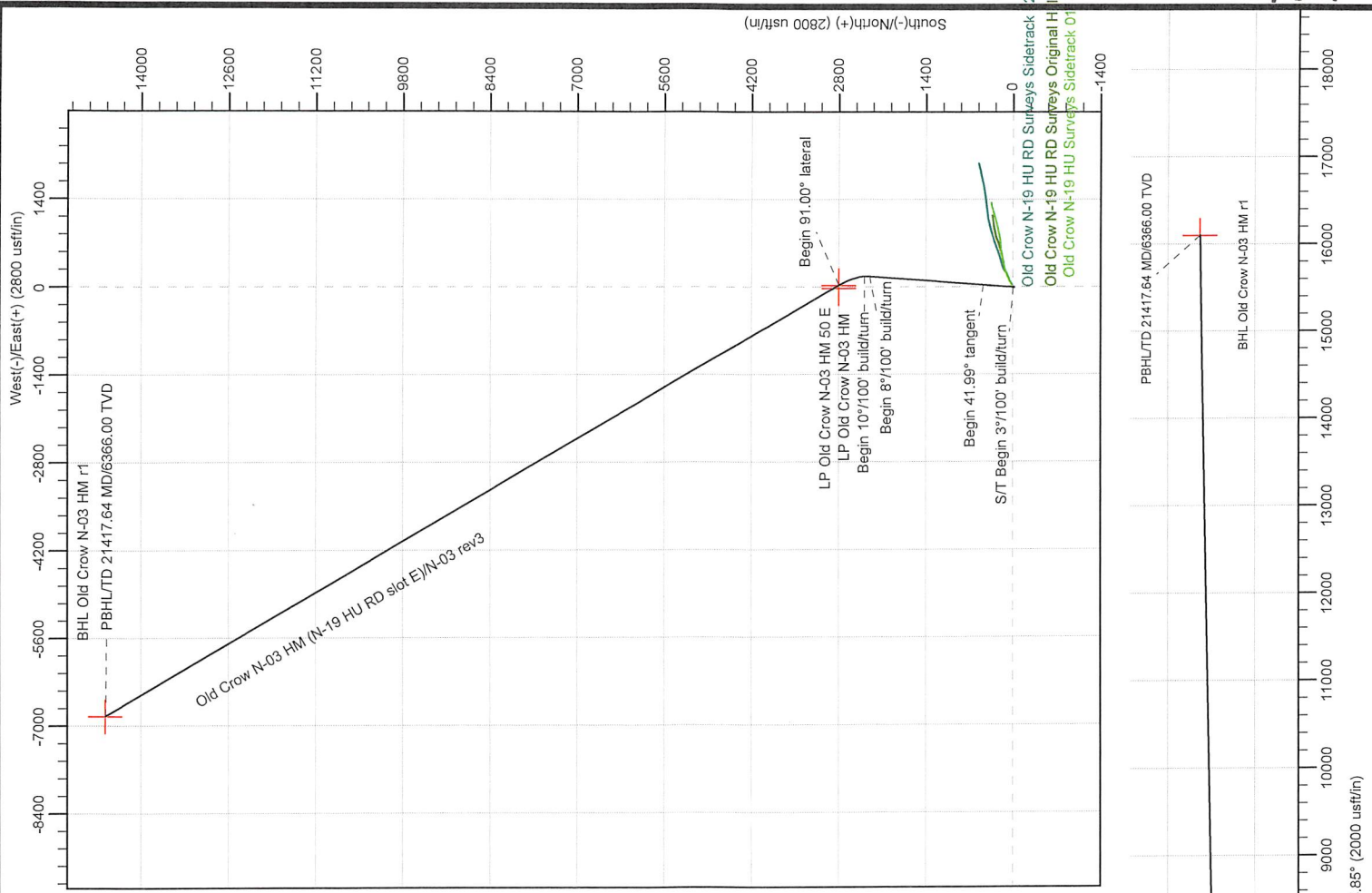


**Geodetic System:** Universal Transverse Mercator (US Survey Feet)  
**Datum:** NAD83 West Virginia - HARN  
**Ellipsoid:** GRS 1980  
**Zone:** Zone 17N (84 W to 78 W)

**System Datum:** Mean Sea Level  
**Depth Reference:** RKB=1265+26 @ 1291.00usft (Nabors B 28)

**Northing:** 14446148.54  
**Easting:** 1707006.66  
**Latitude:** 39.77845193  
**Longitude:** -80.76298617

Total Corr. (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.884°



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SI-D 2270 mon



Planning Report - Geographic

51-02270 map

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Old Crow N-03 HM (N-19 HU RD slot E)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Site:</b>	Old Crow Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Old Crow N-03 HM (N-19 HU RD slot E)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 03		
<b>Design:</b>	N-03 rev3		

<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>	Old Crow Pad				
<b>Site Position:</b>		<b>Northing:</b>	14,446,179.89 usft	<b>Latitude:</b>	39.77853828
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,706,970.33 usft	<b>Longitude:</b>	-80.76311519
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.152 °

<b>Well</b>	Old Crow N-03 HM (N-19 HU RD slot E)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,446,148.54 usft	<b>Latitude:</b>	39.77845193
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,707,006.66 usft	<b>Longitude:</b>	-80.76298617
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,265.00 usft

<b>Wellbore</b>	Sidetrack 03				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	2/21/2020	-8.733	66.733	51,866.07328862

<b>Design</b>	N-03 rev3				
<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	3,049.00	
<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	334.85	

<b>Plan Survey Tool Program</b>	<b>Date</b>	2/24/2020				<b>Received</b> <b>Office of Oil &amp; Gas</b> <b>MAR 17 2017</b>
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>		
1	3,049.00	21,417.64 N-03 rev3 (Sidetrack 03)	MWD	MWD - Standard		

<b>Plan Sections</b>										
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
3,049.00	0.31	182.47	3,048.31	-1.79	-3.62	0.00	0.00	0.00	0.000	
4,459.06	41.99	4.36	4,336.38	487.13	33.79	3.00	2.96	-12.63	-178.122	
7,179.20	41.99	4.36	6,358.10	2,301.71	172.12	0.00	0.00	0.00	0.000	
7,307.79	50.00	355.35	6,447.45	2,393.94	171.40	8.00	6.23	-7.01	-42.203	
7,779.84	91.00	329.72	6,604.00	2,801.26	29.65	10.00	8.69	-5.43	-36.107	
21,417.64	91.00	329.72	6,366.00	14,577.18	-6,844.98	0.00	0.00	0.00	0.000	BHL Old Crow N-03 H





Planning Report - Geographic

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Old Crow N-03 HM (N-19 HU RD slot E)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Site:</b>	Old Crow Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Old Crow N-03 HM (N-19 HU RD slot E)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 03		
<b>Design:</b>	N-03 rev3		

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,049.00	0.31	182.47	3,048.31	-1.79	-3.62	14,446,146.76	1,707,003.04	39.77844705	-80.76299907
<b>S/T Begin 3°/100' build/turn</b>									
3,100.00	1.22	4.83	3,099.30	-1.38	-3.58	14,446,147.16	1,707,003.08	39.77844816	-80.76299892
3,200.00	4.22	4.49	3,199.18	3.35	-3.20	14,446,151.89	1,707,003.46	39.77846115	-80.76299754
3,300.00	7.22	4.43	3,298.67	13.28	-2.43	14,446,161.83	1,707,004.23	39.77848843	-80.76299469
3,400.00	10.22	4.40	3,397.50	28.40	-1.26	14,446,176.94	1,707,005.40	39.77852993	-80.76299040
3,500.00	13.22	4.39	3,495.41	48.65	0.30	14,446,197.19	1,707,006.96	39.77858553	-80.76298466
3,600.00	16.22	4.38	3,592.11	73.98	2.24	14,446,222.52	1,707,008.90	39.77865509	-80.76297751
3,700.00	19.22	4.38	3,687.36	104.33	4.56	14,446,252.87	1,707,011.23	39.77873841	-80.76296895
3,800.00	22.22	4.37	3,780.88	139.60	7.26	14,446,288.14	1,707,013.92	39.77883526	-80.76295901
3,900.00	25.22	4.37	3,872.42	179.70	10.33	14,446,328.25	1,707,016.99	39.77894537	-80.76294772
4,000.00	28.22	4.37	3,961.73	224.53	13.75	14,446,373.07	1,707,020.41	39.77906846	-80.76293511
4,100.00	31.22	4.37	4,048.57	273.96	17.53	14,446,422.50	1,707,024.19	39.77920417	-80.76292121
4,200.00	34.22	4.36	4,132.69	327.85	21.64	14,446,476.39	1,707,028.30	39.77935214	-80.76290606
4,300.00	37.22	4.36	4,213.87	386.06	26.08	14,446,534.60	1,707,032.74	39.77951196	-80.76288971
4,400.00	40.22	4.36	4,291.88	448.42	30.84	14,446,596.96	1,707,037.50	39.77968319	-80.76287219
4,459.06	41.99	4.36	4,336.38	487.13	33.79	14,446,635.67	1,707,040.45	39.77978949	-80.76286132
<b>Begin 41.99° tangent</b>									
4,500.00	41.99	4.36	4,366.81	514.45	35.87	14,446,662.99	1,707,042.53	39.77986448	-80.76285365
4,600.00	41.99	4.36	4,441.13	581.15	40.95	14,446,729.70	1,707,047.62	39.78004765	-80.76283492
4,700.00	41.99	4.36	4,515.46	647.86	46.04	14,446,796.41	1,707,052.70	39.78023081	-80.76281619
4,800.00	41.99	4.36	4,589.78	714.57	51.13	14,446,863.11	1,707,057.79	39.78041397	-80.76279746
4,900.00	41.99	4.36	4,664.10	781.28	56.21	14,446,929.82	1,707,062.87	39.78059714	-80.76277873
5,000.00	41.99	4.36	4,738.43	847.99	61.30	14,446,996.53	1,707,067.96	39.78078030	-80.76276000
5,100.00	41.99	4.36	4,812.75	914.70	66.38	14,447,063.24	1,707,073.05	39.78096347	-80.76274127
5,200.00	41.99	4.36	4,887.08	981.41	71.47	14,447,129.95	1,707,078.13	39.78114663	-80.76272254
5,300.00	41.99	4.36	4,961.40	1,048.12	76.55	14,447,196.66	1,707,083.22	39.78132979	-80.76270381
5,400.00	41.99	4.36	5,035.72	1,114.83	81.64	14,447,263.37	1,707,088.30	39.78151296	-80.76268508
5,500.00	41.99	4.36	5,110.05	1,181.54	86.73	14,447,330.08	1,707,093.39	39.78169612	-80.76266634
5,600.00	41.99	4.36	5,184.37	1,248.24	91.81	14,447,396.79	1,707,098.47	39.78187928	-80.76264761
5,700.00	41.99	4.36	5,258.70	1,314.95	96.90	14,447,463.50	1,707,103.56	39.78206245	-80.76262888
5,800.00	41.99	4.36	5,333.02	1,381.66	101.98	14,447,530.20	1,707,108.65	39.78224561	-80.76261015
5,900.00	41.99	4.36	5,407.34	1,448.37	107.07	14,447,596.91	1,707,113.73	39.78242878	-80.76259142
6,000.00	41.99	4.36	5,481.67	1,515.08	112.15	14,447,663.62	1,707,118.82	39.78261194	-80.76257268
6,100.00	41.99	4.36	5,555.99	1,581.79	117.24	14,447,730.33	1,707,123.90	39.78279510	-80.76255395
6,200.00	41.99	4.36	5,630.32	1,648.50	122.33	14,447,797.04	1,707,128.99	39.78297827	-80.76253522
6,300.00	41.99	4.36	5,704.64	1,715.21	127.41	14,447,863.75	1,707,134.07	39.78316143	-80.76251649
6,400.00	41.99	4.36	5,778.96	1,781.92	132.50	14,447,930.46	1,707,139.16	39.78334460	-80.76249776
6,500.00	41.99	4.36	5,853.29	1,848.62	137.58	14,447,997.17	1,707,144.25	39.78352776	-80.76247902
6,600.00	41.99	4.36	5,927.61	1,915.33	142.67	14,448,063.88	1,707,149.33	39.78371092	-80.76246029
6,700.00	41.99	4.36	6,001.94	1,982.04	147.75	14,448,130.58	1,707,154.42	39.78389409	-80.76244156
6,800.00	41.99	4.36	6,076.26	2,048.75	152.84	14,448,197.29	1,707,159.50	39.78407725	-80.76242282
6,900.00	41.99	4.36	6,150.58	2,115.46	157.93	14,448,264.00	1,707,164.59	39.78426042	-80.76240409
7,000.00	41.99	4.36	6,224.91	2,182.17	163.01	14,448,330.71	1,707,169.67	39.78444358	-80.76238536
7,100.00	41.99	4.36	6,299.23	2,248.88	168.10	14,448,397.42	1,707,174.76	39.78462674	-80.76236663
7,179.20	41.99	4.36	6,358.10	2,301.71	172.12	14,448,450.25	1,707,178.79	39.78477181	-80.76235179
<b>Begin 8°/100' build/turn</b>									
7,200.00	43.24	2.73	6,373.40	2,315.77	172.99	14,448,464.31	1,707,179.66	39.78481040	-80.76234857
7,300.00	49.50	355.83	6,442.42	2,388.01	171.86	14,448,536.55	1,707,178.52	39.78500882	-80.76235193
7,307.79	50.00	355.35	6,447.45	2,393.94	171.40	14,448,542.48	1,707,178.06	39.78502510	-80.76235350
<b>Begin 10°/100' build/turn</b>									
7,400.00	57.64	348.93	6,501.88	2,467.52	161.04	14,448,616.06	1,707,167.70	39.78522725	-80.76238969
7,500.00	66.22	343.11	6,548.93	2,552.97	139.58	14,448,701.51	1,707,146.24	39.78546206	-80.76246526
7,600.00	75.00	338.02	6,582.12	2,641.76	108.13	14,448,790.30	1,707,114.80	39.78570614	-80.76257636

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Old Crow N-03 HM (N-19 HU RD slot E)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Site:</b>	Old Crow Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Old Crow N-03 HM (N-19 HU RD slot E)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 03		
<b>Design:</b>	N-03 rev3		

**Office of Oil & Gas**

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Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
7,700.00	83.88	333.34	6,600.44	2,731.20	67.65	14,448,879.74	1,707,074.31	39.78595207	-80.76271963	
7,779.84	91.00	329.72	6,604.00	2,801.26	29.65	14,448,949.80	1,707,036.32	39.78614475	-80.76285422	
<b>Begin 91.00° lateral</b>										
7,800.00	91.00	329.72	6,603.65	2,818.67	19.49	14,448,967.21	1,707,026.16	39.78619262	-80.76289022	
7,900.00	91.00	329.72	6,601.91	2,905.01	-30.92	14,449,053.56	1,706,975.75	39.78643012	-80.76306885	
8,000.00	91.00	329.72	6,600.16	2,991.36	-81.32	14,449,139.90	1,706,925.34	39.78666762	-80.76324747	
8,100.00	91.00	329.72	6,598.42	3,077.71	-131.73	14,449,226.25	1,706,874.93	39.78690512	-80.76342610	
8,200.00	91.00	329.72	6,596.67	3,164.06	-182.14	14,449,312.60	1,706,824.52	39.78714262	-80.76360473	
8,300.00	91.00	329.72	6,594.93	3,250.41	-232.55	14,449,398.95	1,706,774.11	39.78738012	-80.76378336	
8,400.00	91.00	329.72	6,593.18	3,336.75	-282.96	14,449,485.29	1,706,723.70	39.78761762	-80.76396199	
8,500.00	91.00	329.72	6,591.44	3,423.10	-333.37	14,449,571.64	1,706,673.29	39.78785512	-80.76414062	
8,600.00	91.00	329.72	6,589.69	3,509.45	-383.78	14,449,657.99	1,706,622.89	39.78809262	-80.76431926	
8,700.00	91.00	329.72	6,587.95	3,595.80	-434.18	14,449,744.34	1,706,572.48	39.78833011	-80.76449789	
8,800.00	91.00	329.72	6,586.20	3,682.14	-484.59	14,449,830.69	1,706,522.07	39.78856761	-80.76467653	
8,900.00	91.00	329.72	6,584.46	3,768.49	-535.00	14,449,917.03	1,706,471.66	39.78880511	-80.76485516	
9,000.00	91.00	329.72	6,582.71	3,854.84	-585.41	14,450,003.38	1,706,421.25	39.78904261	-80.76503380	
9,100.00	91.00	329.72	6,580.96	3,941.19	-635.82	14,450,089.73	1,706,370.84	39.78928010	-80.76521244	
9,200.00	91.00	329.72	6,579.22	4,027.53	-686.23	14,450,176.08	1,706,320.43	39.78951760	-80.76539108	
9,300.00	91.00	329.72	6,577.47	4,113.88	-736.64	14,450,262.42	1,706,270.03	39.78975510	-80.76556973	
9,400.00	91.00	329.72	6,575.73	4,200.23	-787.05	14,450,348.77	1,706,219.62	39.78999259	-80.76574837	
9,500.00	91.00	329.72	6,573.98	4,286.58	-837.45	14,450,435.12	1,706,169.21	39.79023009	-80.76592701	
9,600.00	91.00	329.72	6,572.24	4,372.92	-887.86	14,450,521.47	1,706,118.80	39.79046759	-80.76610566	
9,700.00	91.00	329.72	6,570.49	4,459.27	-938.27	14,450,607.81	1,706,068.39	39.79070508	-80.76628431	
9,800.00	91.00	329.72	6,568.75	4,545.62	-988.68	14,450,694.16	1,706,017.98	39.79094258	-80.76646295	
9,900.00	91.00	329.72	6,567.00	4,631.97	-1,039.09	14,450,780.51	1,705,967.57	39.79118007	-80.76664160	
10,000.00	91.00	329.72	6,565.26	4,718.32	-1,089.50	14,450,866.86	1,705,917.16	39.79141757	-80.76682025	
10,100.00	91.00	329.72	6,563.51	4,804.66	-1,139.91	14,450,953.21	1,705,866.76	39.79165506	-80.76699891	
10,200.00	91.00	329.72	6,561.77	4,891.01	-1,190.31	14,451,039.55	1,705,816.35	39.79189256	-80.76717756	
10,300.00	91.00	329.72	6,560.02	4,977.36	-1,240.72	14,451,125.90	1,705,765.94	39.79213005	-80.76735621	
10,400.00	91.00	329.72	6,558.28	5,063.71	-1,291.13	14,451,212.25	1,705,715.53	39.79236754	-80.76753487	
10,500.00	91.00	329.72	6,556.53	5,150.05	-1,341.54	14,451,298.60	1,705,665.12	39.79260504	-80.76771353	
10,600.00	91.00	329.72	6,554.79	5,236.40	-1,391.95	14,451,384.94	1,705,614.71	39.79284253	-80.76789218	
10,700.00	91.00	329.72	6,553.04	5,322.75	-1,442.36	14,451,471.29	1,705,564.30	39.79308002	-80.76807084	
10,800.00	91.00	329.72	6,551.30	5,409.10	-1,492.77	14,451,557.64	1,705,513.90	39.79331752	-80.76824950	
10,900.00	91.00	329.72	6,549.55	5,495.44	-1,543.18	14,451,643.99	1,705,463.49	39.79355501	-80.76842816	
11,000.00	91.00	329.72	6,547.81	5,581.79	-1,593.58	14,451,730.33	1,705,413.08	39.79379250	-80.76860683	
11,100.00	91.00	329.72	6,546.06	5,668.14	-1,643.99	14,451,816.68	1,705,362.67	39.79402999	-80.76878549	
11,200.00	91.00	329.72	6,544.32	5,754.49	-1,694.40	14,451,903.03	1,705,312.26	39.79426748	-80.76896416	
11,300.00	91.00	329.72	6,542.57	5,840.84	-1,744.81	14,451,989.38	1,705,261.85	39.79450497	-80.76914282	
11,400.00	91.00	329.72	6,540.83	5,927.18	-1,795.22	14,452,075.72	1,705,211.44	39.79474246	-80.76932149	
11,500.00	91.00	329.72	6,539.08	6,013.53	-1,845.63	14,452,162.07	1,705,161.03	39.79497995	-80.76950016	
11,600.00	91.00	329.72	6,537.34	6,099.88	-1,896.04	14,452,248.42	1,705,110.63	39.79521744	-80.76967883	
11,700.00	91.00	329.72	6,535.59	6,186.23	-1,946.44	14,452,334.77	1,705,060.22	39.79545493	-80.76985750	
11,800.00	91.00	329.72	6,533.85	6,272.57	-1,996.85	14,452,421.12	1,705,009.81	39.79569242	-80.77003618	
11,900.00	91.00	329.72	6,532.10	6,358.92	-2,047.26	14,452,507.46	1,704,959.40	39.79592991	-80.77021485	
12,000.00	91.00	329.72	6,530.35	6,445.27	-2,097.67	14,452,593.81	1,704,908.99	39.79616740	-80.77039352	
12,100.00	91.00	329.72	6,528.61	6,531.62	-2,148.08	14,452,680.16	1,704,858.58	39.79640489	-80.77057220	
12,200.00	91.00	329.72	6,526.86	6,617.96	-2,198.49	14,452,766.51	1,704,808.17	39.79664238	-80.77075088	
12,300.00	91.00	329.72	6,525.12	6,704.31	-2,248.90	14,452,852.85	1,704,757.77	39.79687987	-80.77092956	
12,400.00	91.00	329.72	6,523.37	6,790.66	-2,299.31	14,452,939.20	1,704,707.36	39.79711736	-80.77110824	
12,500.00	91.00	329.72	6,521.63	6,877.01	-2,349.71	14,453,025.55	1,704,656.95	39.79735484	-80.77128692	
12,600.00	91.00	329.72	6,519.88	6,963.36	-2,400.12	14,453,111.90	1,704,606.54	39.79759233	-80.77146560	
12,700.00	91.00	329.72	6,518.14	7,049.70	-2,450.53	14,453,198.24	1,704,556.13	39.79782982	-80.77164428	
12,800.00	91.00	329.72	6,516.39	7,136.05	-2,500.94	14,453,284.59	1,704,505.72	39.79806731	-80.77182297	



Planning Report - Geographic

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Old Crow N-03 HM (N-19 HU RD slot E)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Site:</b>	Old Crow Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Old Crow N-03 HM (N-19 HU RD slot E)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 03		
<b>Design:</b>	N-03 rev3		

Received  
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Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
12,900.00	91.00	329.72	6,514.65	7,222.40	-2,551.35	14,453,370.94	1,704,455.31	39.79830479	-80.77200166	
13,000.00	91.00	329.72	6,512.90	7,308.75	-2,601.76	14,453,457.29	1,704,404.90	39.79854228	-80.77218034	
13,100.00	91.00	329.72	6,511.16	7,395.09	-2,652.17	14,453,543.64	1,704,354.50	39.79877976	-80.77235903	
13,200.00	91.00	329.72	6,509.41	7,481.44	-2,702.57	14,453,629.98	1,704,304.09	39.79901725	-80.77253772	
13,300.00	91.00	329.72	6,507.67	7,567.79	-2,752.98	14,453,716.33	1,704,253.68	39.79925474	-80.77271641	
13,400.00	91.00	329.72	6,505.92	7,654.14	-2,803.39	14,453,802.68	1,704,203.27	39.79949222	-80.77289511	
13,500.00	91.00	329.72	6,504.18	7,740.48	-2,853.80	14,453,889.03	1,704,152.86	39.79972971	-80.77307380	
13,600.00	91.00	329.72	6,502.43	7,826.83	-2,904.21	14,453,975.37	1,704,102.45	39.79996719	-80.77325249	
13,700.00	91.00	329.72	6,500.69	7,913.18	-2,954.62	14,454,061.72	1,704,052.04	39.80020467	-80.77343119	
13,800.00	91.00	329.72	6,498.94	7,999.53	-3,005.03	14,454,148.07	1,704,001.64	39.80044216	-80.77360989	
13,900.00	91.00	329.72	6,497.20	8,085.87	-3,055.44	14,454,234.42	1,703,951.23	39.80067964	-80.77378859	
14,000.00	91.00	329.72	6,495.45	8,172.22	-3,105.84	14,454,320.76	1,703,900.82	39.80091713	-80.77396728	
14,100.00	91.00	329.72	6,493.71	8,258.57	-3,156.25	14,454,407.11	1,703,850.41	39.80115461	-80.77414599	
14,200.00	91.00	329.72	6,491.96	8,344.92	-3,206.66	14,454,493.46	1,703,800.00	39.80139209	-80.77432469	
14,300.00	91.00	329.72	6,490.22	8,431.27	-3,257.07	14,454,579.81	1,703,749.59	39.80162957	-80.77450339	
14,400.00	91.00	329.72	6,488.47	8,517.61	-3,307.48	14,454,666.16	1,703,699.18	39.80186706	-80.77468210	
14,500.00	91.00	329.72	6,486.73	8,603.96	-3,357.89	14,454,752.50	1,703,648.77	39.80210454	-80.77486080	
14,600.00	91.00	329.72	6,484.98	8,690.31	-3,408.30	14,454,838.85	1,703,598.37	39.80234202	-80.77503951	
14,700.00	91.00	329.72	6,483.23	8,776.66	-3,458.70	14,454,925.20	1,703,547.96	39.80257950	-80.77521822	
14,800.00	91.00	329.72	6,481.49	8,863.00	-3,509.11	14,455,011.55	1,703,497.55	39.80281698	-80.77539693	
14,900.00	91.00	329.72	6,479.74	8,949.35	-3,559.52	14,455,097.89	1,703,447.14	39.80305446	-80.77557564	
15,000.00	91.00	329.72	6,478.00	9,035.70	-3,609.93	14,455,184.24	1,703,396.73	39.80329194	-80.77575435	
15,100.00	91.00	329.72	6,476.25	9,122.05	-3,660.34	14,455,270.59	1,703,346.32	39.80352943	-80.77593306	
15,200.00	91.00	329.72	6,474.51	9,208.39	-3,710.75	14,455,356.94	1,703,295.91	39.80376691	-80.77611178	
15,300.00	91.00	329.72	6,472.76	9,294.74	-3,761.16	14,455,443.28	1,703,245.51	39.80400438	-80.77629049	
15,400.00	91.00	329.72	6,471.02	9,381.09	-3,811.57	14,455,529.63	1,703,195.10	39.80424186	-80.77646921	
15,500.00	91.00	329.72	6,469.27	9,467.44	-3,861.97	14,455,615.98	1,703,144.69	39.80447934	-80.77664793	
15,600.00	91.00	329.72	6,467.53	9,553.79	-3,912.38	14,455,702.33	1,703,094.28	39.80471682	-80.77682665	
15,700.00	91.00	329.72	6,465.78	9,640.13	-3,962.79	14,455,788.67	1,703,043.87	39.80495430	-80.77700537	
15,800.00	91.00	329.72	6,464.04	9,726.48	-4,013.20	14,455,875.02	1,702,993.46	39.80519178	-80.77718409	
15,900.00	91.00	329.72	6,462.29	9,812.83	-4,063.61	14,455,961.37	1,702,943.05	39.80542926	-80.77736281	
16,000.00	91.00	329.72	6,460.55	9,899.18	-4,114.02	14,456,047.72	1,702,892.64	39.80566674	-80.77754154	
16,100.00	91.00	329.72	6,458.80	9,985.52	-4,164.43	14,456,134.07	1,702,842.24	39.80590421	-80.77772026	
16,200.00	91.00	329.72	6,457.06	10,071.87	-4,214.83	14,456,220.41	1,702,791.83	39.80614169	-80.77789899	
16,300.00	91.00	329.72	6,455.31	10,158.22	-4,265.24	14,456,306.76	1,702,741.42	39.80637917	-80.77807772	
16,400.00	91.00	329.72	6,453.57	10,244.57	-4,315.65	14,456,393.11	1,702,691.01	39.80661664	-80.77825645	
16,500.00	91.00	329.72	6,451.82	10,330.91	-4,366.06	14,456,479.46	1,702,640.60	39.80685412	-80.77843518	
16,600.00	91.00	329.72	6,450.08	10,417.26	-4,416.47	14,456,565.80	1,702,590.19	39.80709160	-80.77861391	
16,700.00	91.00	329.72	6,448.33	10,503.61	-4,466.88	14,456,652.15	1,702,539.78	39.80732907	-80.77879264	
16,800.00	91.00	329.72	6,446.59	10,589.96	-4,517.29	14,456,738.50	1,702,489.38	39.80756655	-80.77897137	
16,900.00	91.00	329.72	6,444.84	10,676.31	-4,567.70	14,456,824.85	1,702,438.97	39.80780402	-80.77915011	
17,000.00	91.00	329.72	6,443.10	10,762.65	-4,618.10	14,456,911.19	1,702,388.56	39.80804150	-80.77932885	
17,100.00	91.00	329.72	6,441.35	10,849.00	-4,668.51	14,456,997.54	1,702,338.15	39.80827897	-80.77950758	
17,200.00	91.00	329.72	6,439.61	10,935.35	-4,718.92	14,457,083.89	1,702,287.74	39.80851645	-80.77968632	
17,300.00	91.00	329.72	6,437.86	11,021.70	-4,769.33	14,457,170.24	1,702,237.33	39.80875392	-80.77986506	
17,400.00	91.00	329.72	6,436.12	11,108.04	-4,819.74	14,457,256.59	1,702,186.92	39.80899140	-80.78004380	
17,500.00	91.00	329.72	6,434.37	11,194.39	-4,870.15	14,457,342.93	1,702,136.51	39.80922887	-80.78022255	
17,600.00	91.00	329.72	6,432.62	11,280.74	-4,920.56	14,457,429.28	1,702,086.11	39.80946634	-80.78040129	
17,700.00	91.00	329.72	6,430.88	11,367.09	-4,970.96	14,457,515.63	1,702,035.70	39.80970382	-80.78058004	
17,800.00	91.00	329.72	6,429.13	11,453.43	-5,021.37	14,457,601.98	1,701,985.29	39.80994129	-80.78075878	
17,900.00	91.00	329.72	6,427.39	11,539.78	-5,071.78	14,457,688.32	1,701,934.88	39.81017876	-80.78093753	
18,000.00	91.00	329.72	6,425.64	11,626.13	-5,122.19	14,457,774.67	1,701,884.47	39.81041623	-80.78111628	
18,100.00	91.00	329.72	6,423.90	11,712.48	-5,172.60	14,457,861.02	1,701,834.06	39.81065371	-80.78129503	
18,200.00	91.00	329.72	6,422.15	11,798.82	-5,223.01	14,457,947.37	1,701,783.65	39.81089118	-80.78147378	
18,300.00	91.00	329.72	6,420.41	11,885.17	-5,273.42	14,458,033.71	1,701,733.25	39.81112865	-80.78165253	



Planning Report - Geographic

5102270000

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Old Crow N-03 HM (N-19 HU RD slot E)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Site:</b>	Old Crow Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Old Crow N-03 HM (N-19 HU RD slot E)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 03		
<b>Design:</b>	N-03 rev3		

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Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
18,400.00	91.00	329.72	6,418.66	11,971.52	-5,323.83	14,458,120.06	1,701,682.84	39.81136612	-80.78183129	
18,500.00	91.00	329.72	6,416.92	12,057.87	-5,374.23	14,458,206.41	1,701,632.43	39.81160359	-80.78201004	
18,600.00	91.00	329.72	6,415.17	12,144.22	-5,424.64	14,458,292.76	1,701,582.02	39.81184106	-80.78218880	
18,700.00	91.00	329.72	6,413.43	12,230.56	-5,475.05	14,458,379.11	1,701,531.61	39.81207853	-80.78236755	
18,800.00	91.00	329.72	6,411.68	12,316.91	-5,525.46	14,458,465.45	1,701,481.20	39.81231600	-80.78254631	
18,900.00	91.00	329.72	6,409.94	12,403.26	-5,575.87	14,458,551.80	1,701,430.79	39.81255347	-80.78272507	
19,000.00	91.00	329.72	6,408.19	12,489.61	-5,626.28	14,458,638.15	1,701,380.38	39.81279094	-80.78290383	
19,100.00	91.00	329.72	6,406.45	12,575.95	-5,676.69	14,458,724.50	1,701,329.98	39.81302841	-80.78308260	
19,200.00	91.00	329.72	6,404.70	12,662.30	-5,727.09	14,458,810.84	1,701,279.57	39.81326588	-80.78326136	
19,300.00	91.00	329.72	6,402.96	12,748.65	-5,777.50	14,458,897.19	1,701,229.16	39.81350335	-80.78344012	
19,400.00	91.00	329.72	6,401.21	12,835.00	-5,827.91	14,458,983.54	1,701,178.75	39.81374081	-80.78361889	
19,500.00	91.00	329.72	6,399.47	12,921.34	-5,878.32	14,459,069.89	1,701,128.34	39.81397828	-80.78379766	
19,600.00	91.00	329.72	6,397.72	13,007.69	-5,928.73	14,459,156.23	1,701,077.93	39.81421575	-80.78397643	
19,700.00	91.00	329.72	6,395.98	13,094.04	-5,979.14	14,459,242.58	1,701,027.52	39.81445322	-80.78415520	
19,800.00	91.00	329.72	6,394.23	13,180.39	-6,029.55	14,459,328.93	1,700,977.12	39.81469068	-80.78433397	
19,900.00	91.00	329.72	6,392.49	13,266.74	-6,079.96	14,459,415.28	1,700,926.71	39.81492815	-80.78451274	
20,000.00	91.00	329.72	6,390.74	13,353.08	-6,130.36	14,459,501.62	1,700,876.30	39.81516562	-80.78469151	
20,100.00	91.00	329.72	6,389.00	13,439.43	-6,180.77	14,459,587.97	1,700,825.89	39.81540308	-80.78487029	
20,200.00	91.00	329.72	6,387.25	13,525.78	-6,231.18	14,459,674.32	1,700,775.48	39.81564055	-80.78504906	
20,300.00	91.00	329.72	6,385.50	13,612.13	-6,281.59	14,459,760.67	1,700,725.07	39.81587802	-80.78522784	
20,400.00	91.00	329.72	6,383.76	13,698.47	-6,332.00	14,459,847.02	1,700,674.66	39.81611548	-80.78540662	
20,500.00	91.00	329.72	6,382.01	13,784.82	-6,382.41	14,459,933.36	1,700,624.25	39.81635295	-80.78558540	
20,600.00	91.00	329.72	6,380.27	13,871.17	-6,432.82	14,460,019.71	1,700,573.85	39.81659041	-80.78576418	
20,700.00	91.00	329.72	6,378.52	13,957.52	-6,483.22	14,460,106.06	1,700,523.44	39.81682788	-80.78594296	
20,800.00	91.00	329.72	6,376.78	14,043.86	-6,533.63	14,460,192.41	1,700,473.03	39.81706534	-80.78612174	
20,900.00	91.00	329.72	6,375.03	14,130.21	-6,584.04	14,460,278.75	1,700,422.62	39.81730280	-80.78630053	
21,000.00	91.00	329.72	6,373.29	14,216.56	-6,634.45	14,460,365.10	1,700,372.21	39.81754027	-80.78647931	
21,100.00	91.00	329.72	6,371.54	14,302.91	-6,684.86	14,460,451.45	1,700,321.80	39.81777773	-80.78665810	
21,200.00	91.00	329.72	6,369.80	14,389.26	-6,735.27	14,460,537.80	1,700,271.39	39.81801519	-80.78683689	
21,300.00	91.00	329.72	6,368.05	14,475.60	-6,785.68	14,460,624.14	1,700,220.99	39.81825266	-80.78701568	
21,400.00	91.00	329.72	6,366.31	14,561.95	-6,836.09	14,460,710.49	1,700,170.58	39.81849012	-80.78719447	
21,417.64	91.00	329.72	6,366.00	14,577.18	-6,844.98	14,460,725.72	1,700,161.69	39.81853200	-80.78722600	

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PBHL/TD 21417.64 MD/6366.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
BHL Old Crow N-03 HM - hit/miss target - Shape - plan hits target center - Point	0.00	0.00	6,366.00	14,577.18	-6,844.98	14,460,725.72	1,700,161.69	39.81853200	-80.78722600	
LP Old Crow N-03 HM 5 - plan misses target center by 0.12usft at 7779.79usft MD (6604.00 TVD, 2801.21 N, 29.68 E) - Point	0.00	0.00	6,604.00	2,801.16	29.58	14,448,949.70	1,707,036.24	39.78614446	-80.76285450	
LP Old Crow N-03 HM - plan misses target center by 43.30usft at 7804.99usft MD (6603.56 TVD, 2822.98 N, 16.98 E) - Point	0.00	0.00	6,604.00	2,801.16	-20.42	14,448,949.70	1,706,986.24	39.78614482	-80.76303247	



Planning Report - Geographic

<b>Database:</b>	DB_Aug1919_v14	<b>Local Co-ordinate Reference:</b>	Well Old Crow N-03 HM (N-19 HU RD slot E)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	RKB=1265+26 @ 1291.00usft (Nabors B 28)
<b>Site:</b>	Old Crow Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Old Crow N-03 HM (N-19 HU RD slot E)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 03		
<b>Design:</b>	N-03 rev3		

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Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,049.00	3,048.31	-1.79	-3.62	S/T Begin 3°/100' build/turn
4,459.06	4,336.38	487.13	33.79	Begin 41.99° tangent
7,179.20	6,358.10	2,301.71	172.12	Begin 8°/100' build/turn
7,307.79	6,447.45	2,393.94	171.40	Begin 10°/100' build/turn
7,779.84	6,604.00	2,801.26	29.65	Begin 91.00° lateral
21,417.64	6,366.00	14,577.18	-6,844.98	PBHL/TD 21417.64 MD/6366.00 TVD



# Well Site Safety Plan

## Tug Hill Operating, LLC

*JRC 3/4/2020*

Well Name: Old Crow N-19HU

Pad Location: Old Crow Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,403,194.88

Easting: 520,296.67

Office of Oil & Gas

MAR 17 2017

*20*

March 2020

WW-6A1  
(5/13)

Operator's Well No. Old Crow N-19HU

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

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

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

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

\*See attached pages

**\*Co-tenancy utilization – At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act.**

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

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

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

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

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







Dom0122015

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*24985	5-9-29.1	I	JOYANTHAN BAKER WHEELING SOCIETY FOR CRIPPLED CHILDREN JAY E PRAGER	TH EXPLORATION LLC	1/8+	1027 558	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*21937	5-9-29.1	I	PRESIDENT	TH EXPLORATION LLC	1/8+	960 33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22326	5-9-29.1	I	RACHEL SONDA AND SCOTT SONDA	TH EXPLORATION LLC	1/8+	962 532	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*23035	5-9-29.1	I	DEAN S CARR	TH EXPLORATION LLC	1/8+	977 184	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*24888	5-9-29.1	I	ARTHUR LEE MILLER ET AL SANDRA PARDINI AKA KATHERINE S PARDINI AND ALLEN F PARDINI	TH EXPLORATION LLC	1/8+	1027 367	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*25642	5-9-29.1	I		TH EXPLORATION LLC	1/8+	1031 540	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
C090332007	5-9-29.1	I	ROBERT RANDOLPH WOODBURN ET UX	NOBLE ENERGY INC	1/8+	860 568	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
C090332003	5-9-29.1	I	PATTY BERGFORD ET VIR	NOBLE ENERGY INC	1/8+	860 555	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
C090332002	5-9-29.1	I	LORETTA JEAN RIGGLE ET VIR CARLA JO ALLEN AND KENNETH ALLEN 10*17512 5-9-29.2 10*19572 5-9-29.2 10*22296 5-9-29.2 10*22407 5-9-29.2 10*22656 5-9-29.2 10*17530 5-9-29.2 10*17916 5-9-29.2 10*18270 5-9-29.2 10*18796 5-9-29.2 10*21478 5-9-29.2 10*22044 5-9-29.2 10*22430 5-9-29.2 10*22492 5-9-29.2 10*22547 5-9-29.2 10*22606 5-9-29.2 10*24985 5-9-29.2 10*22326 5-9-29.2	NOBLE ENERGY INC	1/8+	860 538	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 39/1
10*17600	5-9-29.1	I		TH EXPLORATION LLC	1/8+	916 129	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*17512	5-9-29.2	J	BONNIE LOU POSTLEWAT	TH EXPLORATION LLC	1/8+	917 68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*19572	5-9-29.2	J	DOUGLAS R BISHOP	TH EXPLORATION LLC	1/8+	943 12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22296	5-9-29.2	J	NOAH BAKER AND ALISA BAKER	TH EXPLORATION LLC	1/8+	962 200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22407	5-9-29.2	J	BRADLEY MURPHY	TH EXPLORATION LLC	1/8+	962 575	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22656	5-9-29.2	J	CHANDA WILSON AND DANIEL WILSON	TH EXPLORATION LLC	1/8+	968 226	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*17530	5-9-29.2	J	WOODROW N WARD AND HILDA A WARD	TH EXPLORATION LLC	1/8+	916 208	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*17916	5-9-29.2	J	MARY E BISHOP	TH EXPLORATION LLC	1/8+	927 167	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18270	5-9-29.2	J	GERALD L BISHOP III	TH EXPLORATION, LLC	1/8+	943 10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18796	5-9-29.2	J	DWIG OIL & GAS ACQUISITIONS LLC	TH EXPLORATION, LLC	1/8+	938 476	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*21478	5-9-29.2	J	CHILDRENS HOME SOCIETY OF WEST VIRGINIA	TH EXPLORATION LLC	1/8+	960 173	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22044	5-9-29.2	J	MICHAEL A BISHOP	TH EXPLORATION LLC	1/8+	960 421	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22430	5-9-29.2	J	DEBORAH VANVANKEN	TH EXPLORATION LLC	1/8+	964 510	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22492	5-9-29.2	J	FATHI MARIE FREESTONE AND ERIC FREESTONE	TH EXPLORATION LLC	1/8+	972 50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22547	5-9-29.2	J	LAURENCE EDWARD MURPHY AND JOAN MARIE MURPHY	TH EXPLORATION LLC	1/8+	966 628	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22606	5-9-29.2	J	ROBERT B MURPHY AND LINDA MURPHY	TH EXPLORATION LLC	1/8+	966 469	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*23508	5-9-29.2	J	MICHAEL A MURPHY	TH EXPLORATION LLC	1/8+	1009 98	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*24985	5-9-29.2	J	JOYANTHAN BAKER	TH EXPLORATION LLC	1/8+	1027 558	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22326	5-9-29.2	J	RACHEL SONDA AND SCOTT SONDA WHEELING SOCIETY FOR CRIPPLED CHILDREN JAY E PRAGER PRESIDENT	TH EXPLORATION LLC	1/8+	962 532	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*21937	5-9-29.2	J		TH EXPLORATION LLC	1/8+	960 33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*23035	5-9-29.2	J	DEAN S CARR	TH EXPLORATION LLC	1/8+	977 184	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*24888	5-9-29.2	J	ARTHUR LEE MILLER ET AL	TH EXPLORATION LLC	1/8+	1027 367	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*19193	5-9-29.2	J	LARRA A GUMP	TRIENERGY HOLDINGS, LLC	1/8+	717 488	N/A	N/A	N/A	N/A	N/A	N/A	TriEnergy Holdings Inc & TriEnergy Inc to Chevron USA Inc: 28/356	

TriEnergy Holdings Inc to Chevron USA Inc to TH Exploration LLC: 40/127



51-02270mod

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
Q090332002	5-9-29	K	LORETTA JEAN RIGGLE ET VIR	NOBLE ENERGY INC	1/8+	860 538	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q090332003	5-9-29	K	PATTY BERNSFORD ET VIR	NOBLE ENERGY INC	1/8+	860 555	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q090332007	5-9-29	K	ROBERT RANDOLPH WOODBURN ET UX	NOBLE ENERGY INC	1/8+	860 568	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
10*21547	5-9-30.1	L	GARY A MILLER AND MARCELLE T MILLER	TH EXPLORATION LLC	1/8+	952 370	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21548	5-9-30.1	L	JEANNE M MILLER	TH EXPLORATION LLC	1/8+	952 386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21719	5-9-30.1	L	ROBERT A MILLER	TH EXPLORATION LLC	1/8+	952 389	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22566	5-9-30.1	L	KENNETH A MILLER	TH EXPLORATION LLC	1/8+	964 233	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CV935271	5-9-30.1	L	CHARLES W. MILLER AND ESTHER JEAN MILLER	CHEVRON USA INC	1/8+	853 59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CV935273	5-9-30.1	L	PAUL PARSONS ET UX	CHEVRON USA INC	1/8+	853 430	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CV935276	5-9-30.1	L	SHARON LYNN RUSSELL	CHEVRON USA INC	1/8+	853 422	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CV935969	5-9-30.1	L	TIMOTHY HUFF ET UX	CHEVRON USA INC	1/8+	864 47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX936053	5-9-30.1	L	LLOYD C. ARNOLD ET UX	CHEVRON USA INC	1/8+	864	39	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936054	5-9-30.1	L	MARY JO CRONIN	CHEVRON USA INC	1/8+	864	43	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936058	5-9-30.1	L	RICHARD KURPIL ET UX	CHEVRON USA INC	1/8+	863	594	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936061	5-9-30.1	L	CLARA MAE CLIFTON	CHEVRON USA INC	1/8+	853	426	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936062	5-9-30.1	L	GEORGE EDWARDS ET UX	CHEVRON USA INC	1/8+	853	418	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936112	5-9-30.1	L	DONNA FAE KYLE	CHEVRON USA INC	1/8+	853	449	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936113	5-9-30.1	L	JUDITH MAY CONNER	CHEVRON USA INC	1/8+	853	445	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866958	5-9-30.1	L	ANITA L. SLOUGH AND WILLIAM O. JOBS	AB RESOURCES LLC	1/8+	696	7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

2020-10-15

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CVX866959	5-9-30.1	L	PAUL SCHEIBELHOOD ET AL	AB RESOURCES LLC	1/8+	695 629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866958	5-9-40	M	CHARLES W. MILLER AND ESTHER JEAN MILLER	CHEVRON USA INC	1/8+	853 59	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866959	5-9-40	M	PAUL PARSONS ET UX	CHEVRON USA INC	1/8+	853 430	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935271	5-9-40	M	SHARON LYNN RUSSELL	CHEVRON USA INC	1/8+	853 422	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935273	5-9-40	M	TIMOTHY HUFF ET UX	CHEVRON USA INC	1/8+	864 47	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935276	5-9-40	M	LLOYD C. ARNOLD ET UX	CHEVRON USA INC	1/8+	864 39	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935969	5-9-40	M	MARY JO CRONIN	CHEVRON USA INC	1/8+	864 43	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936053	5-9-40	M	RICHARD KURPIL ET UX	CHEVRON USA INC	1/8+	863 594	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX936054	5-9-40	M	CLARA MAE CLIFTON	CHEVRON USA INC	1/8+	853 426	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936058	5-9-40	M	GEORGE EDWARDS ET UX	CHEVRON USA INC	1/8+	853 418	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936061	5-9-40	M	DONNA FAE KYLE	CHEVRON USA INC	1/8+	853 449	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936062	5-9-40	M	JUDITH MAY CONNER	CHEVRON USA INC	1/8+	853 445	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936112	5-9-40	M	ANITA L. SLOUGH AND WILLIAM O. JOBBS	AB RESOURCES LLC	1/8+	696 7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936113	5-9-40	M	PAUL SCHEIBELHOOD ET AL	AB RESOURCES LLC	1/8+	695 629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935271	5-9-39	N	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853 59	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935273	5-9-39	N	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853 430	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX935276	5-9-39	N	SHARON LYNN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853 422	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935969	5-9-39	N	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864 47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936053	5-9-39	N	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864 39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936054	5-9-39	N	MARY JO GRONIN	CHEVRON U.S.A., INC.	1/8+	864 43	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936058	5-9-39	N	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863 594	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936061	5-9-39	N	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853 426	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936062	5-9-39	N	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853 418	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936112	5-9-39	N	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853 449	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH HG Energy II Exploration LLC and HG Energy II Appalachia, LLC: 988/286



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CX936113	5-9-39	N	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853	445	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CX936959	5-9-39	N	PAUL SCHEBELHOOD AND DELORIS LEE SCHEBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695	629	AB Resources LLC to NPAR LLC: 25/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	41/155	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/155
CX936958	5-9-39	N	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696	7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	41/156	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/156
10*27025	5-9-33	O	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1034	626	N/A	N/A	N/A	N/A	N/A	N/A	
10*27025	5-9-33.4	P	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1034	626	N/A	N/A	N/A	N/A	N/A	N/A	
CX935271	5-9-32.11	Q	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853	59	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CX935273	5-9-32.11	Q	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853	430	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CX935276	5-9-32.11	Q	SHARON LYNN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853	422	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CX935969	5-9-32.11	Q	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864	47	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CX936053	5-9-32.11	Q	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864	39	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	

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CX936054	5-9-32.11	Q	MARY JO CROWIN	CHEVRON U.S.A., INC.	1/8+	864 43	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX936058	5-9-32.11	Q	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863 594	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX936061	5-9-32.11	Q	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853 426	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX936062	5-9-32.11	Q	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853 418	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX936112	5-9-32.11	Q	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853 449	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX936113	5-9-32.11	Q	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853 445	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX936959	5-9-32.11	Q	PAUL SCHEBELHOOD AND DELORIS LEE SCHEBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695 629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/155	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX936958	5-9-32.11	Q	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBS, A SINGLE MAN	AB RESOURCES LLC	1/8+	696 7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	Chevron USA Inc to HG Energy II Appalachia LLC: 41/156	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286

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CX935271	5-9-32.10	R	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853	59	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX935273	5-9-32.10	R	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853	430	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX935276	5-9-32.10	R	SHARON LYNN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853	422	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX935969	5-9-32.10	R	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864	47	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX9356053	5-9-32.10	R	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864	39	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX9356054	5-9-32.10	R	MARY JO CROMIN	CHEVRON U.S.A., INC.	1/8+	864	43	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX9356058	5-9-32.10	R	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863	594	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286
CX9356061	5-9-32.10	R	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853	426	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC. 988/286

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CVX936062	5-9-32.10	R	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853	418	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936112	5-9-32.10	R	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853	449	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936113	5-9-32.10	R	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853	445	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866959	5-9-32.10	R	PAUL SCHEIBELHOOD AND DELORIS LEE SCHEIBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695	629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enrplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enrplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/155	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866958	5-9-32.10	R	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696	7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enrplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enrplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	Chevron USA Inc to HG Energy II Appalachia LLC: 41/156	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935271	5-9-32.8	S	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853	59	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935273	5-9-32.8	S	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853	430	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935276	5-9-32.8	S	SHARON LYNN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853	422	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

10/22/2015

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
CV9396059	5-9-32.8	S	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864 / 47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286
CV9396053	5-9-32.8	S	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864 / 39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286
CV9396054	5-9-32.8	S	MARY JO CROVIN	CHEVRON U.S.A., INC.	1/8+	864 / 43	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286
CV9396058	5-9-32.8	S	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863 / 594	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286
CV9396061	5-9-32.8	S	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853 / 426	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286
CV9396062	5-9-32.8	S	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853 / 418	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286
CV9396112	5-9-32.8	S	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853 / 449	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286
CV9396113	5-9-32.8	S	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853 / 445	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Energy II Appalachia, LLC: 988/286

51-02270m00

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
CX936959	5-9-32.8	S	PAUL SCHEIBELHOOD AND DELORES LEE SCHEIBELHOOD, HUSBAND AND WIFE AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695 629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP;	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc. 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc. 25/105	AB Resources LLC to NPAR LLC 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/155	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CX936958	5-9-32.8	S	ANITA SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696 7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP;	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc. 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc. 25/106	AB Resources LLC to NPAR LLC 25/485	NPAR LLC to Chevron USA: 756/333	Chevron USA Inc to HG Energy II Appalachia LLC: 41/156	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CX935271	5-9-32.5	T	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853 59	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CX935273	5-9-32.5	T	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853 430	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CX935276	5-9-32.5	T	SHARON LYNN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853 422	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CX935969	5-9-32.5	T	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864 47	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CX936053	5-9-32.5	T	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864 39	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CX936054	5-9-32.5	T	MARY JO CROMIN	CHEVRON U.S.A., INC.	1/8+	864 43	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	

51-02270 mod

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
CYX936058	5-9-32.5	T	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863 594	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CYX936061	5-9-32.5	T	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853 426	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CYX936062	5-9-32.5	T	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853 418	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CYX936112	5-9-32.5	T	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853 449	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CYX936113	5-9-32.5	T	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853 445	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CYX866959	5-9-32.5	T	PAUL SCHEIBELHOOD AND DELOIRIS LEE SCHEIBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695 629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	41/155	Chevron USA Inc to HG Energy II Appalachia LLC: 41/155	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CYX866958	5-9-32.5	T	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696 7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	41/156	Chevron USA Inc to HG Energy II Appalachia LLC: 41/156	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q078775000	5-9-34.2	U	MILLARD BONNETTE JR AND SANDRA J BONNETTE	NOBLE ENERGY INC	1/8+	810 70	N/A	N/A	N/A	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

02/14/2019

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
C078775000	5-9-34.5	V	MILLARD BONNETTE JR AND SANDRA J BONNETTE	NOBLE ENERGY INC	1/8+	810 70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
10*26004	5-9-34.1	W	VAN SCYOC LOUIS ET UX	AB RESOURCES LLC	1/8+	697 461	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 43/95
10*26004	5-9-34.4	X	VAN SCYOC LOUIS ET UX	AB RESOURCES LLC	1/8+	697 461	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 43/95
10*25487	5-8-8	Y	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1031 538	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*25370	5-8-8	Y	JAMES EDWARD & LAJRA J FRANCIS	TH EXPLORATION LLC	1/8+	1030 377	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21546	5-8-7	Z	EDWIN C MILLER AND KIMBERLY ANN MILLER	TH EXPLORATION LLC	1/8+	957 257	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CVX946510	5-8-5	AA	NICOLE GATTS-SFX	CHEVRON U.S.A., INC	1/8+	899 470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX947093	5-8-5	AA	RICHARD J. GATTS	CHEVRON USA INC	1/8+	899 479	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX947094	5-8-5	AA	LOIS ZWOLENSKY-SFX	CHEVRON U.S.A., INC	1/8+	899 476	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX920045	5-5-4.1	BB	GENEVA BASSETT SANCHEZ AKA GENEVA A BASSETT SANCHEZ	CHEVRON U.S.A., INC	1/8+	813 593	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805001	5-5-4.1	BB	ROGER B ROSE ET UX	NOBLE ENERGY INC	1/8+	841 358	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286



51-02270m00

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
C086805002	5-5-4.1	BB	MARY E BASSETT	NOBLE ENERGY INC	1/8+	841 362	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286
C086805003	5-5-4.1	BB	RUTH ANN WALLACE ET VIR	NOBLE ENERGY INC	1/8+	841 364	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286
C086805004	5-5-4.1	BB	CHARLES HOWARD BASSETT JR ET UX	NOBLE ENERGY INC	1/8+	842 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286
C086805005	5-5-4.1	BB	RUTH E BASSETT MEADOWS ET VIR	NOBLE ENERGY INC	1/8+	842 38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286
C086805006	5-5-4.1	BB	ROBERT B THOMAS ET UX	NOBLE ENERGY INC	1/8+	842 28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286
C086805007	5-5-4.1	BB	ELIZABETH A STRAUSBAUGH ET VIR	NOBLE ENERGY INC	1/8+	841 370	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286
C086805008	5-5-4.1	BB	CYNTHIA P HOPKINS REVOCABLE TRUST UTA	NOBLE ENERGY INC	1/8+	841 366	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286
C086805009	5-5-4.1	BB	JANET BLANKENSHIP ET VIR	NOBLE ENERGY INC	1/8+	841 368	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Noble Energy Inc to HG Energy II Appalachia, LLC: 988/286

02020-10

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
C086805010	5-5-4.1	BB	JEAN C THOMAS	NOBLE ENERGY INC	1/8+	841 449	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805011	5-5-4.1	BB	BARBARA KAY EWING ET VIR	NOBLE ENERGY INC	1/8+	842 34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CX9318645	5-5-4	CC	GENEVIA BASSETT SANCHEZ	CHEVRON U.S.A., INC	1/8+	814 399	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805001	5-5-4	CC	ROGER B ROSE ET UX	NOBLE ENERGY INC	1/8+	841 358	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805002	5-5-4	CC	MARY E BASSETT	NOBLE ENERGY INC	1/8+	841 362	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805003	5-5-4	CC	RUTH ANN WALLACE ET VIR	NOBLE ENERGY INC	1/8+	841 364	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805004	5-5-4	CC	CHARLES HOWARD BASSETT JR ET UX	NOBLE ENERGY INC	1/8+	842 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805005	5-5-4	CC	RUTH E BASSETT MEADOWS ET VIR	NOBLE ENERGY INC	1/8+	842 38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

51-0220m00

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
C086805006	5-5-4	CC	ROBERT B THOMAS ET UX	NOBLE ENERGY INC	1/8+	842 28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805007	5-5-4	CC	ELIZABETH A STRAUSBAUGH ET VIR	NOBLE ENERGY INC	1/8+	841 370	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805008	5-5-4	CC	CYNTHIA P HOPKINS REVOCABLE TRUST UTA	NOBLE ENERGY INC	1/8+	841 366	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805009	5-5-4	CC	JANET BLANKENSHIP ET VIR	NOBLE ENERGY INC	1/8+	841 368	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805010	5-5-4	CC	JEAN THOMAS	NOBLE ENERGY INC	1/8+	841 449	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C086805011	5-5-4	CC	BARBARA KAY EWING ET VIR	NOBLE ENERGY INC	1/8+	842 34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
C081030000	5-8-3	DD	TAMMY L MITCHELL ET VIR	NOBLE ENERGY INC	1/8+	816 176	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

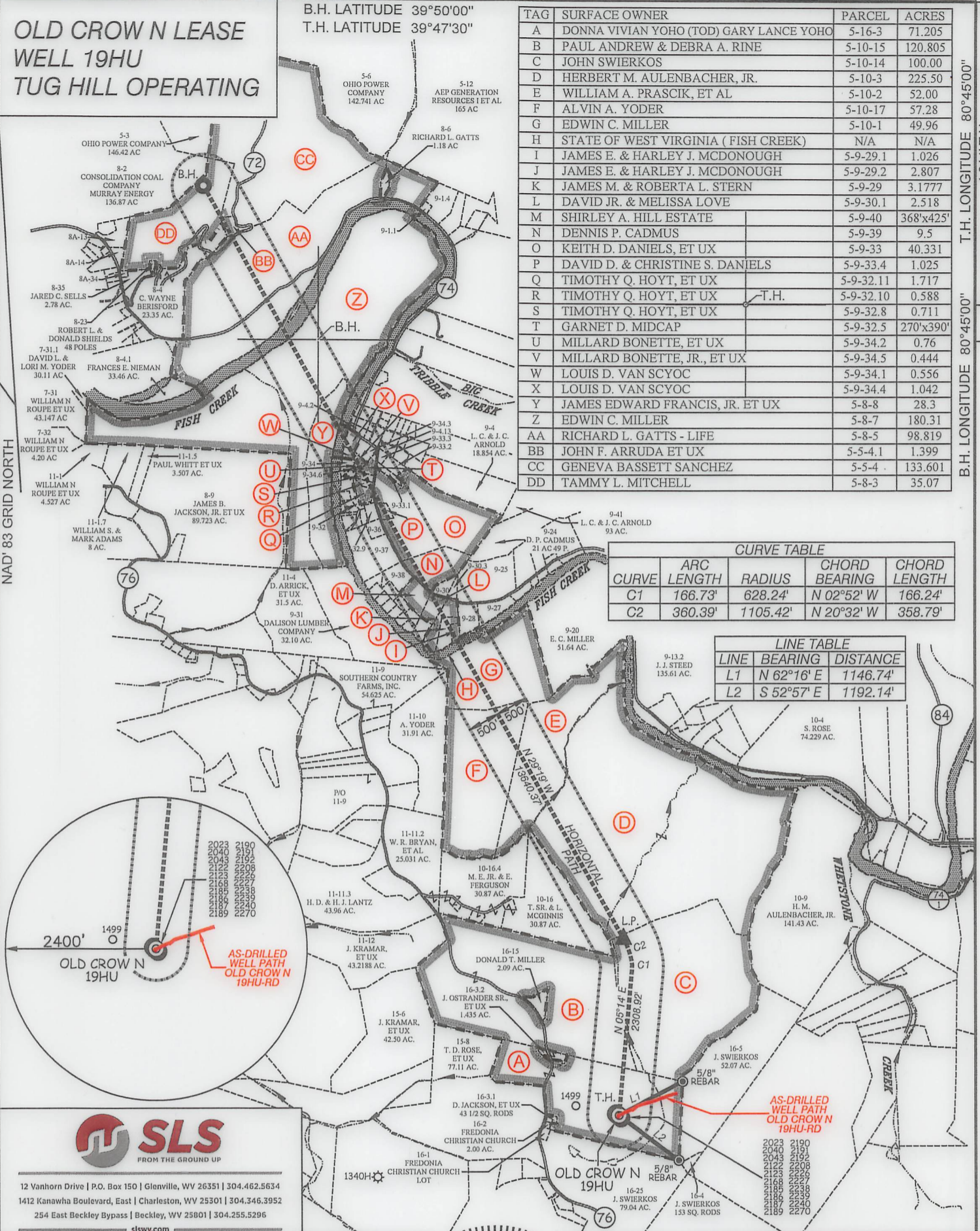
**OLD CROW N LEASE  
WELL 19HU  
TUG HILL OPERATING**

B.H. LATITUDE 39°50'00"  
T.H. LATITUDE 39°47'30"

TAG	SURFACE OWNER	PARCEL	ACRES	
A	DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO	5-16-3	71.205	
B	PAUL ANDREW & DEBRA A. RINE	5-10-15	120.805	
C	JOHN SWIERKOS	5-10-14	100.00	
D	HERBERT M. AULENBACHER, JR.	5-10-3	225.50	
E	WILLIAM A. PRASCIK, ET AL	5-10-2	52.00	
F	ALVIN A. YODER	5-10-17	57.28	
G	EDWIN C. MILLER	5-10-1	49.96	
H	STATE OF WEST VIRGINIA ( FISH CREEK)	N/A	N/A	
I	JAMES E. & HARLEY J. MCDONOUGH	5-9-29.1	1.026	
J	JAMES E. & HARLEY J. MCDONOUGH	5-9-29.2	2.807	
K	JAMES M. & ROBERTA L. STERN	5-9-29	3.1777	
L	DAVID JR. & MELISSA LOVE	5-9-30.1	2.518	
M	SHIRLEY A. HILL ESTATE	5-9-40	368'x425'	
N	DENNIS P. CADMUS	5-9-39	9.5	
O	KEITH D. DANIELS, ET UX	5-9-33	40.331	
P	DAVID D. & CHRISTINE S. DANIELS	5-9-33.4	1.025	
Q	TIMOTHY Q. HOYT, ET UX	5-9-32.11	1.717	
R	TIMOTHY Q. HOYT, ET UX	T.H.	5-9-32.10	0.588
S	TIMOTHY Q. HOYT, ET UX	5-9-32.8	0.711	
T	GARNET D. MIDCAP	5-9-32.5	270'x390'	
U	MILLARD BONETTE, ET UX	5-9-34.2	0.76	
V	MILLARD BONETTE, JR., ET UX	5-9-34.5	0.444	
W	LOUIS D. VAN SCYOC	5-9-34.1	0.556	
X	LOUIS D. VAN SCYOC	5-9-34.4	1.042	
Y	JAMES EDWARD FRANCIS, JR. ET UX	5-8-8	28.3	
Z	EDWIN C. MILLER	5-8-7	180.31	
AA	RICHARD L. GATTS - LIFE	5-8-5	98.819	
BB	JOHN F. ARRUDA ET UX	5-5-4.1	1.399	
CC	GENEVA BASSETT SANCHEZ	5-5-4	133.601	
DD	TAMMY L. MITCHELL	5-8-3	35.07	

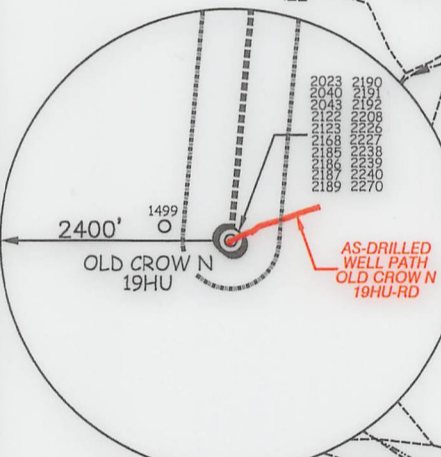
NAD'83 GRID NORTH

T.H. LONGITUDE 80°45'00"  
B.H. LONGITUDE 80°45'00"  
4,814' T.H.  
5,392' B.H.



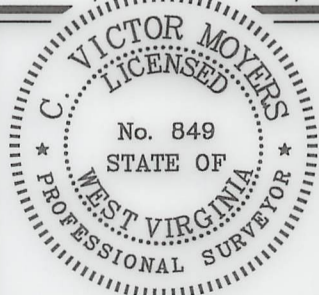
CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	166.73'	628.24'	N 02°52' W	166.24'
C2	360.39'	1105.42'	N 20°32' W	358.79'

LINE	BEARING	DISTANCE
L1	N 62°16' E	1146.74'
L2	S 52°57' E	1192.14'



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  
slsvv.com

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)		
NAD'83 S.P.C.(FT)	N. 468,146.92	E. 1,613,548.58
NAD'83 GEO.	LAT-(N) 39.778452	LONG-(W) 80.762986
NAD'83 UTM (M)	N. 4,403,194.88	E. 520,296.67
LANDING POINT		
NAD'83 S.P.C.(FT)	N. 470,948.2	E. 1,613,625.0
NAD'83 GEO.	LAT-(N) 39.786145	LONG-(W) 80.762854
NAD'83 UTM (M)	N. 4,404,048.7	E. 520,305.7
BOTTOM HOLE		
NAD'83 S.P.C.(FT)	N. 482,841.4	E. 1,606,945.8
NAD'83 GEO.	LAT-(N) 39.818532	LONG-(W) 80.787226
NAD'83 UTM (M)	N. 4,407,638.0	E. 518,210.3



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
P.S. 849 *C. Victor Moyers*

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-6A1)	

SCALE 1" = 2000' FILE NO. 8796P19HU(3HM-REV3).dwg  
DATE MARCH 4, 2020  
REVISED  
OPERATORS WELL NO. OLD CROW N-19HU  
API WELL NO. 47-051-02270mwp  
NO. STATE COUNTY PERMIT

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

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

COUNTY NAME  
PERMIT

10,456' B.H.

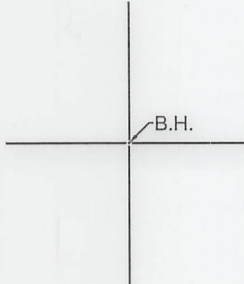
3,650' T.H.

**OLD CROW N LEASE  
WELL 19HU  
TUG HILL OPERATING**

T.H. LATITUDE 39°47'30"  
B.H. LATITUDE 39°50'00"

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)		
NAD'83 S.P.C.(FT)	N. 468,146.92	E. 1,613,548.58
NAD'83 GEO.	LAT-(N) 39.778452	LONG-(W) 80.762986
NAD'83 UTM (M)	N. 4,403,194.88	E. 520,296.67
<u>LANDING POINT</u>		
NAD'83 S.P.C.(FT)	N. 470,948.2	E. 1,613,625.0
NAD'83 GEO.	LAT-(N) 39.786145	LONG-(W) 80.762854
NAD'83 UTM (M)	N. 4,404,048.7	E. 520,305.7
<u>BOTTOM HOLE</u>		
NAD'83 S.P.C.(FT)	N. 482,841.4	E. 1,606,945.8
NAD'83 GEO.	LAT-(N) 39.818532	LONG-(W) 80.787226
NAD'83 UTM (M)	N. 4,407,638.0	E. 518,210.3

T.H. LONGITUDE 80°45'00"  
B.H. LONGITUDE 80°45'00"  
5,392' B.H.  
4,814' T.H.

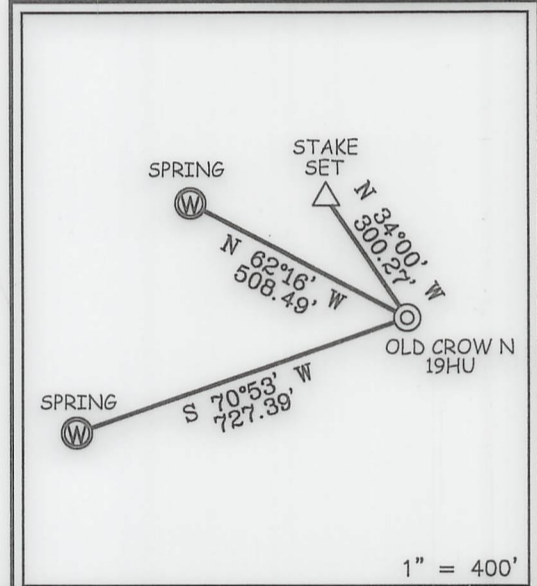


**NOTES ON SURVEY**

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS OR DWELLINGS ≥ 2500 SQ. FT. 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.
- THIS WELL PLAT PERTAINS TO A RE-PERMIT OF A PREVIOUSLY PROPOSED OLD CROW N-19HU, THAT WAS PARTIALLY DRILLED AND PLUGGED, AS SHOWN HEREON AND IDENTIFIED AS AN AS-DRILLED PATH. THIS CURRENT PROPOSED LATERAL RETAINS THE NAME OF THE PREVIOUSLY PERMITTED OLD CROW N-19HU LATERAL, HOWEVER THESE DESIGN PLANS INTEGRATE A NEW TOP HOLE LOCATION AS WELL AS PARTIAL LATERAL DESIGN OF A PREVIOUSLY PROPOSED OLD CROW N-03HM. THE TARGET FORMATION OF THIS PROPOSED OLD CROW N-19HU LATERAL IS MARCELLUS AND NOT POINT PLEASANT, AS PREVIOUSLY PERMITTED.
- ALL AS-DRILLED, LATERAL DESIGN AND RE-PERMIT INFORMATION PROVIDED TO SLS BY TUG HILL OPERATING, LLC.

**REFERENCES**

MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
5-8A-13	LETHA I. RUCKMAN	2.993
5-8A-14	BOARD OF EDUCATION	137 SQ RODS
5-8A-34	NORMAN G. JOHNSON ET UX - LIFE	11,123 SQ. FT.
5-9-1.1	FRANK C. CLARK	0.52
5-9-1.4	SHELDON R. RUCKMAN ET AL - LIFE	4.49
5-9-4.2	LINDA J. SIMMONS	0.80
5-9-4.13	SAMUEL LEE CANTERBURY, ET UX	0.9284
5-9-25	DELBERT K. & LINDA K. MYERS	14.49
5-9-27	JOHN F. KAZEMKA	4.02
5-9-28	WILLIAM N. & DOLORES E. MCDONOUGH - LIFE	4.01
5-9-30	MATTHEW B. GRIFFITH	2.708
5-9-30.3	MATTHEW B. GRIFFITH	0.82
5-9-32	SANDRA J. BONNETTE	2.321
5-9-32.9	LIONEL E. HENRY, SR., ET AL	1.269
5-9-33.1	DANIELS FAMILY TRUST	1
5-9-33.2	DANIELS FAMILY TRUST	1.534
5-9-33.3	RALPH EARL DUNLAP - LIFE	0.50
5-9-34	LOUIS D. & PATRICIA L. VAN SCYOC	0.850
5-9-34.3	SANDRA J. BONNETTE	1.988
5-9-34.6	EARL B. SUTER, JR., ET UX	0.085
5-9-36	FRANK T. & ANNA M. WALKER	PARCEL
5-9-37	FRANK T. & ANNA M. WALKER	10.857
5-9-38	SHIRLEY A. HILL EST.	3.331

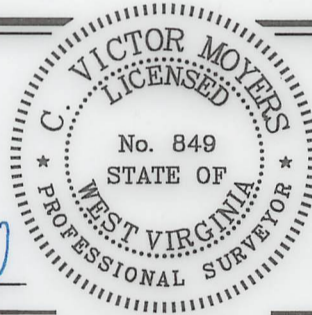


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1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952  
254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
slsvv.com

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 MARCH 4, 20 20  
REVISED \_\_\_\_\_  
OPERATORS WELL NO. OLD CROW N-19HU  
API WELL NO. 47 - 051 - 02270MDD  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8796P19HU(3HM-REV3).dwg  
SCALE 1" = 2000'  
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

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



WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ IF "GAS" PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X  
LOCATION: GROUND = 1,288.00' ELEVATION PROPOSED = 1,264.99' WATERSHED TRIBUTARY OF FISH CREEK (HUC-10)  
DISTRICT FRANKLIN COUNTY MARSHALL QUADRANGLE POWHATAN POINT 7.5'  
SURFACE OWNER DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO ACREAGE 71.205±  
ROYALTY OWNER DONNA VIVIAN YOHO, ET AL ACREAGE 71.205±  
PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE X 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: 6,727' / TMD: 21,418'

COUNTY NAME PERMIT

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

31-02270009

DPS LAND SERVICES CORP  
6000 TOWN CENTER BOULEVARD, SUITE 145  
CANONSBURG PA 15317-5841

BOOK 0040 PAGE 0057

STATE OF WEST VIRGINIA            §  
  §  
COUNTY OF MARSHALL            §

**ASSIGNMENT AND BILL OF SALE**

This **ASSIGNMENT AND BILL OF SALE** (this "Assignment") dated as of August 1, 2017 (the "Signing Date"), but effective from and after 7:00 a.m., Eastern Standard Time on August 2, 2017 being the day immediately following the Signing Date (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 Bryan 1H 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 and Greene 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 August 1, 2017 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 other entity or (B) the voting interest in such other entity if such entity does not have either shares or directors.

"Applicable Law(s)" means all laws, principles of common law, regulations, statutes, codes, rules, orders, ordinances, permits, enforceable policies, licenses, certifications, decrees, constitutions, standards or other requirements with similar effect of any Government Entity and any binding interpretations of the foregoing.

"Assets" has the meaning given to such term in Section 2.1 of this Assignment.

"Assigned Hydrocarbons" means all Hydrocarbons produced and severed from, or allocable, after severance, to the Leases, Units, and Wells on and after the Effective Date.

51-02220 m00

MICHAEL MORAN  
BRIGHTON RESOURCES  
5851 ELLSWORTH AVENUE, #1  
PITTSBURGH PA 15232-1707

BOOK 0:040 PAGE 0127

STATE OF WEST VIRGINIA §  
  §  
COUNTY OF MARSHALL §

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

**ASSIGNMENT AND CONVEYANCE**

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

**WITNESSETH:**

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

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

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

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon, except that Assignor excepts and reserves from this Assignment the following:
  - A. The Chevron ORRI previously conveyed to Assignor and as described in that certain Memorandum of Assignment of Oil and Gas Lease Interests dated November 6, 2012 by and between Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia, and
  - B. As to each of the Leases and all oil, gas, and associated hydrocarbons produced, saved and sold thereunder, an overriding royalty interest equal to the difference between 82% and the

COPY

STATE OF WEST VIRGINIA §  
§  
COUNTY OF MARSHALL §

Marshall County  
Jan Pest, Clerk  
Instrument 1453305  
04/24/2019 @ 11:51:22 AM  
ASSIGNMENTS  
Book 43 @ Page 503  
Pages Recorded 10  
Recording Cost \$ 17.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 23<sup>rd</sup> day of April, 2019 (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 November 15, 2018 (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-2, 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 Leases since the time that Assignor obtained its interests in the Leases. Assignor 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 this Assignment, unto the Assignee and its respective successors and assigns, against the lawful claims of Assignor, and all persons claiming, or to claim, the same or any part thereof, by, through or under Assignor.

Assignor represents and warrants that Assignor has paid any and all bonuses, rentals, royalties, overriding royalties, and other payments required by the Leases which were due for the period in which Assignor held its interests in the Leases, and that Assignor has fully performed all conditions necessary to maintain the Leases in full force and effect during such period, free and clear of all Encumbrances, except for and subject only to Permitted Encumbrances.

3. Successors and Assigns. The terms of this Assignment shall be binding upon and inure to the benefit of the parties hereto and each of their respective successors



**MEMORANDUM OF OPERATING AGREEMENT AND FINANCING STATEMENT**

This Memorandum of Operating Agreement and Financing Statement (hereinafter referred to as "Memorandum") is executed to be effective concurrently with that certain Operating Agreement (the "Operating Agreement") by and between TH Exploration, LLC, as Operator, and HG Energy II Appalachia, LLC and TH Exploration II, LLC, as Non-Operators, covering, among other things, the development and production of crude oil, natural gas and associated substances from the leases (hereinafter called the "Contract Area") described on Exhibit "A-1" and Exhibit "A-2" attached hereto and owned by Operator and Non-Operator in the respective percentages of shares indicated on Exhibit "A" to the Operating Agreement.

The Operating Agreement contains an Accounting Procedure, along with provisions giving the parties hereto mutual liens and security interests where one or more parties hereto are or may become Debtors to one or more other parties hereto. This Memorandum incorporates by reference all of the terms and conditions of the Operating Agreement, including but not limited to the lien and security interest provisions.

The purpose of this Memorandum is to place third parties on notice of the Operating Agreement, and to secure and perfect the mutual liens and security interests of the parties hereto.

The Operating Agreement specifically provides and the parties do hereby confirm and agree that:

1. The Operator shall conduct and direct and have full control of all operations on the Contract Area as permitted and required by, and within the limits of, the Operating Agreement.
2. The liability of the parties under the Operating Agreement shall be several, not joint or collective. Each party shall be responsible only for its obligations and shall be liable only for its proportionate share of costs.
3. Each Non-Operator grants to Operator a lien upon its oil and gas rights, oil and gas leases and mineral interests in the Contract Area, and a security interest in its share of oil and/or gas when extracted and its interest in all fixtures, inventory, personal property and equipment located on or used on the Contract Area and in all its contract rights and receivables related thereto and arising therefrom to secure payment of its present and future share of costs and expenses, together with interest thereon at the rate provided in the Accounting Procedure referred to above. To the extent that Operator has a security interest under the Uniform Commercial Code ("Code") of the state or states in which the Contract Area is located, Operator without prejudice and in addition to all other legal, equitable and contractual remedies which are expressly reserved, shall be entitled to exercise the rights and remedies of a secured party under the Code. The bringing of a suit and the obtaining of judgment by Operator for the secured indebtedness shall not be deemed an election of remedies or otherwise affect the rights or security interests for the payment thereof.
4. The Operator grants to Non-Operator a lien and security interest equivalent to that granted to Operator as described in Paragraph 3 above, to secure payment by Operator of its own share of costs and expenses when due.

DPS LAND SERVICES CORP  
6000 TOWN CENTER BOULEVARD, SUITE 145  
CANDONSBURG PA 15317-5841

BOOK-0043 PAGE 0095

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