



west virginia department of environmental protection

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

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

Monday, March 15, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

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

Re: Permit Modification Approval for KNOB CREEK S-8HM
47-051-02283-00-00

Lateral Extension

TUG HILL OPERATING, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.



James A. Martin
Chief

Operator's Well Number: KNOB CREEK S-8HM
Farm Name: DAVID LEE FRANKLIN
U.S. WELL NUMBER: 47-051-02283-00-00
Horizontal 6A New Drill
Date Modification Issued: 3/15/2021

Promoting a healthy environment.

03/19/2021



February 16, 2021

WADE STANSBERRY
WV DEP OFFICE OF OIL & GAS
601 57TH STREET SE
CHARLESTON, WV 25304-2345

VIA USPS

**RE: Knob Creek S-8HM API # 47-051-02283 (H6A Permit Modification)
Meade District, Marshall County, WV**

Dear Wade:

Tug Hill Operating, LLC is submitting a permit modification for its permitted well, Knob Creek S-8HM to add 6,844.49' to the lateral length. Therefore, enclosed please find the following:

- Modified WW-6B with changes highlighted in yellow
- Updated well plat
- Updated WW-6A1 information
- Updated Site Safety Plan (The only information that has changed is the contact information for the Inspector at the contact list at the end of the Plan).

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

Sincerely,

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

Enclosures

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WW-6B
(04/15)

API NO. 47- 051 - 02283 *Mod*
 OPERATOR WELL NO. Knob Creek S-8HM
 Well Pad Name: Knob Creek

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259ft ³ (CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	480'	480'	683ft ³ (CTS)
Coal	13 3/8"	NEW	J55	54.5#	480'	480'	683ft ³ (CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,303'	2,303'	745ft ³ (CTS)
Production	5 1/2"	NEW	P110	20#	15,453'	15,453'	3,942ft ³ (CTS)
Tubing	2 3/8"	NEW	N80	4.7#	5,937'		
Liners							

BS 1-28-21

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

PACKERS

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

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WW-6B
(10/14)

API NO. 47- 051 - 02283 *Mod*
OPERATOR WELL NO. Knob Creek S-8HM
Well Pad Name: Knob Creek

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.

B.S 1-28-21

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

Well to completed with approximately 21,700,000 lb. proppant and 390,000 barrels of water.
Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 12.93 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.55 acres

23) Describe centralizer placement for each casing string:

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

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

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

25) Proposed borehole conditioning procedures:

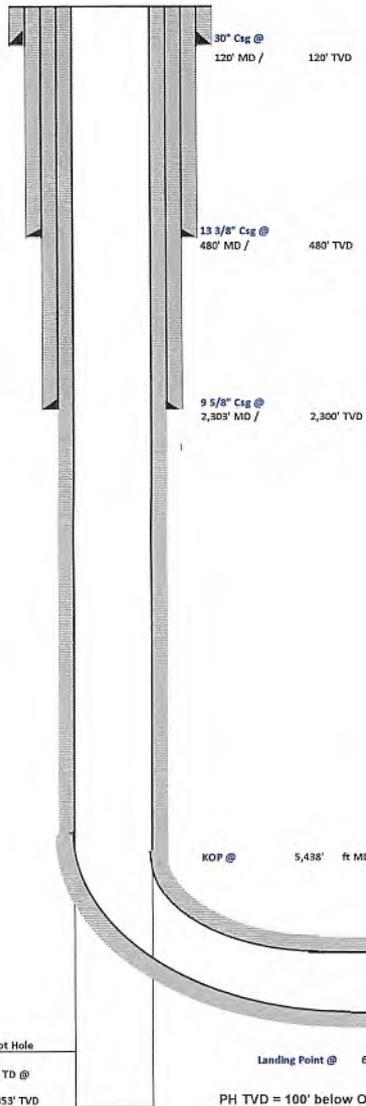
Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow POOH.

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*Note: Attach additional sheets as needed.



WELL NAME: Knob Creek 5-8HM
 STATE: WV COUNTY: Marshall
 DISTRICT: Meade
 DF Elev: 737' GL Elev: 737'
 TD: 15,453'
 TH Latitude: 39.7701084
 TH Longitude: -80.70545046
 BH Latitude: 39.750759
 BH Longitude: -80.690397



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	380
Sewickley Coal	292
Pittsburgh Coal	374
Big Line	1697
Weir	1998
Berea	2182
Gordon	2445
Rhinestreet	5559
Genesen/Burkett	6071
Tully	6101
Hamilton	6134
Marcellus	6202
Landing Depth	6237
Onondaga	6253
Pilot Hole Depth	6353

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	480'	480'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,303'	2,300'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	15,453'	6,388'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	661	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	784	A	15	Air	1 Centralizer every other jt
Production	3,621	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

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Lateral TD @ 15,453' ft MD
 6,388 ft TVD



Tug Hill Operating, LLC Casing and Cement Program

Knob Creek S-8HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	480'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,303'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	15,453'	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: Knob Creek S-08HM (slot F)
 Site: Knob Creek
 Project: Marshall County, West Virginia.
 Design: rev5

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1550.00	5.00	333.58	1549.68	9.76	-4.85	2.00	333.58	-10.86	Begin 5.00° tangent
4	3206.62	5.00	333.58	3200.00	139.07	-59.09	0.00	0.00	-154.75	Begin 2°/100' build
5	3911.83	26.12	339.52	3875.54	314.02	-137.87	3.00	7.26	-340.04	Begin 26.12° tangent
6	5437.50	26.12	339.52	5245.36	943.34	-372.89	0.00	0.00	-1000.14	Begin 8°/100' build/turn
7	6383.74	50.00	147.67	6102.77	812.66	-230.62	8.00	170.66	-814.68	Begin 10°/100' build/turn
8	6774.50	89.00	150.29	6237.00	504.49	-46.56	10.00	4.15	-455.74	Begin 89.00° lateral
9	15452.54	89.00	150.29	6388.00	-7031.36	4254.20	0.00	0.00	8218.16	PBHL/TD 15452.53 MD 6388.00 TVD

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

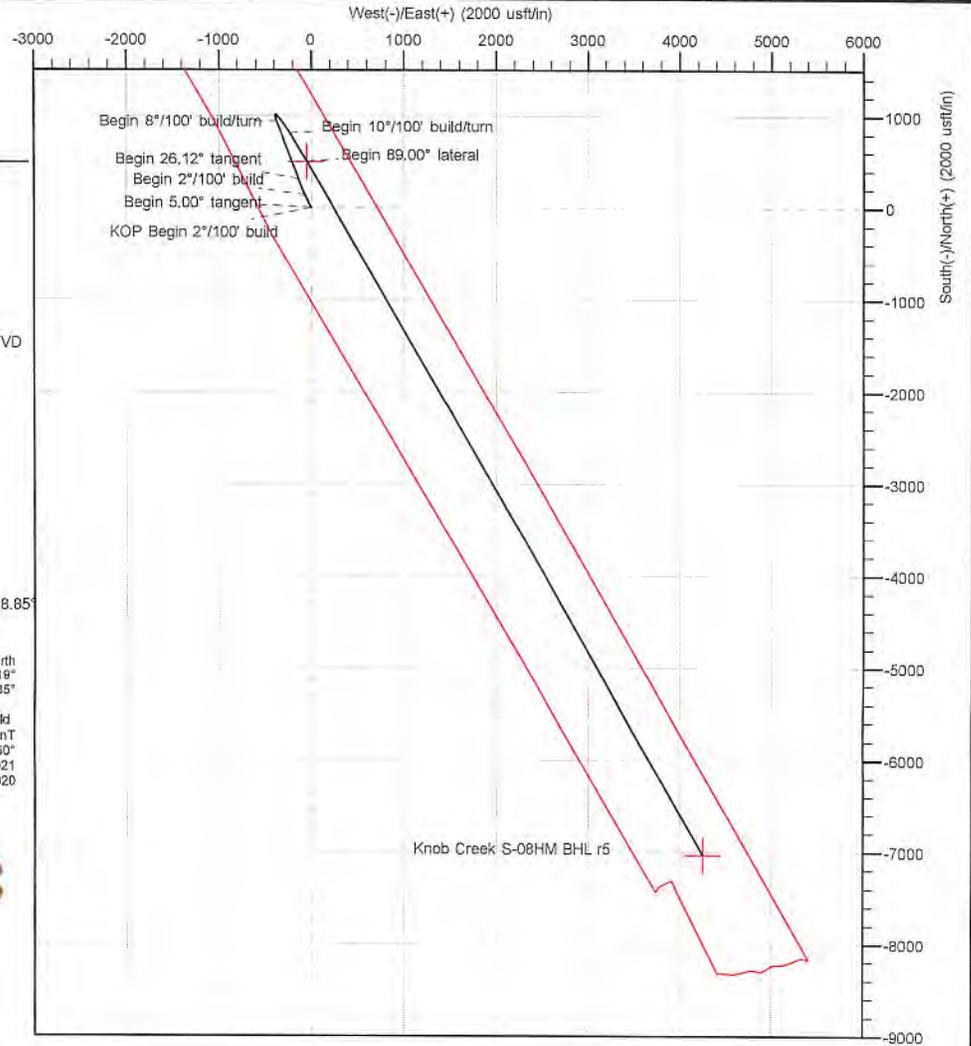
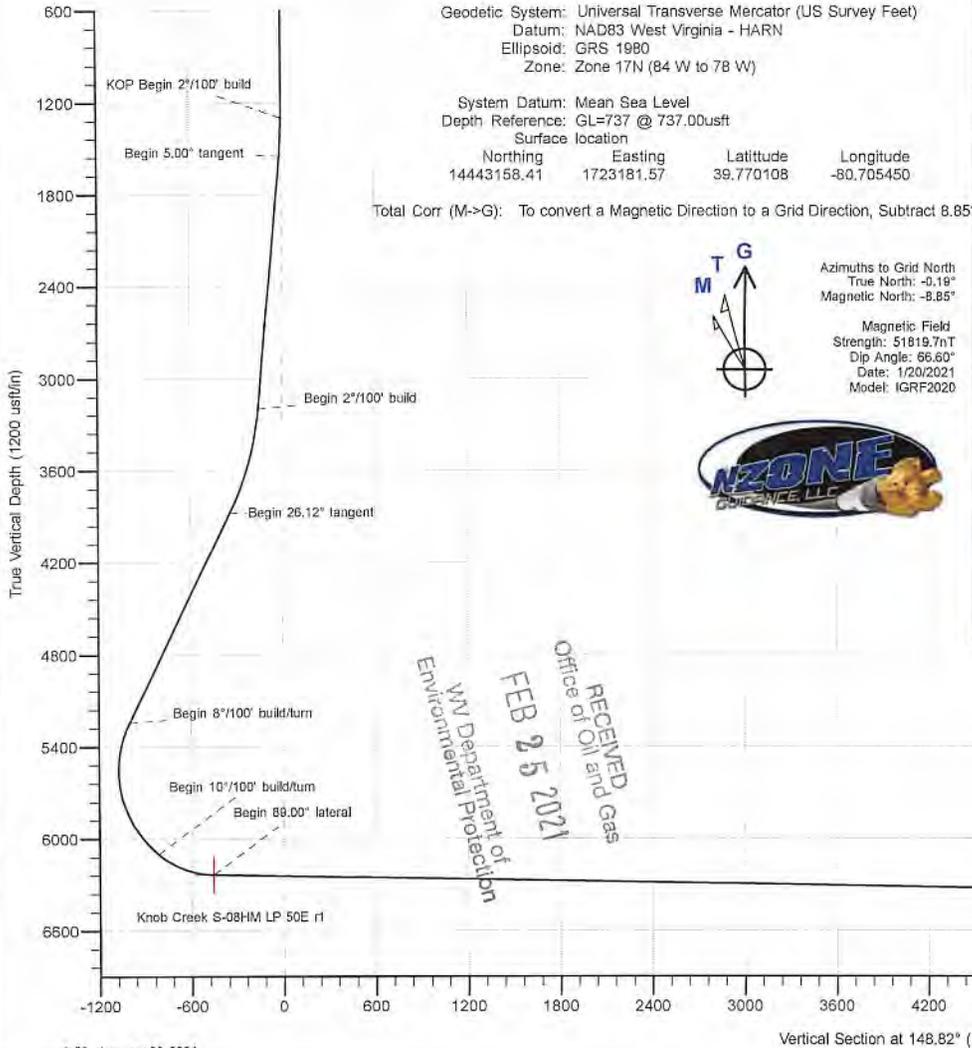
System Datum: Mean Sea Level
 Depth Reference: GL=737 @ 737.00usft
 Surface location

Northing	Easting	Latitude	Longitude
14443158.41	1723181.57	39.770108	-80.705450

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.85°



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Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Knob Creek S-08HM (slot F)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=737 @ 737.00usft
Project:	Marshall County, West Virginia.	MD Reference:	GL=737 @ 737.00usft
Site:	Knob Creek	North Reference:	Grid
Well:	Knob Creek S-08HM (slot F)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,550.00	5.00	333.58	1,549.68	9.76	-4.85	2.00	2.00	0.00	333.58	
3,206.62	5.00	333.58	3,200.00	139.07	-69.09	0.00	0.00	0.00	0.00	
3,911.83	26.12	339.52	3,875.54	314.02	-137.87	3.00	3.00	0.84	7.26	
5,437.50	26.12	339.52	5,245.36	943.34	-372.89	0.00	0.00	0.00	0.00	
6,383.74	50.00	147.67	6,102.77	812.66	-230.62	8.00	2.52	17.77	170.66	
6,774.50	89.00	150.29	6,237.00	504.49	-46.56	10.00	9.98	0.67	4.15	
15,452.54	89.00	150.29	6,388.00	-7,031.36	4,254.20	0.00	0.00	0.00	0.00	Knob Creek S-08HM

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Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Knob Creek S-08HM (slot F)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=737 @ 737.00usft
Project:	Marshall County, West Virginia.	MD Reference:	GL=737 @ 737.00usft
Site:	Knob Creek	North Reference:	Grid
Well:	Knob Creek S-08HM (slot F)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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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
0.00	0.00	0.00	0.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
100.00	0.00	0.00	100.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
200.00	0.00	0.00	200.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
300.00	0.00	0.00	300.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
400.00	0.00	0.00	400.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
500.00	0.00	0.00	500.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
600.00	0.00	0.00	600.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
700.00	0.00	0.00	700.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
800.00	0.00	0.00	800.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
900.00	0.00	0.00	900.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,443,158.41	1,723,181.57	39.770109	-80.705451
KOP Begin 2°/100' build									
1,400.00	2.00	333.58	1,399.98	1.56	-0.78	14,443,159.98	1,723,180.79	39.770113	-80.705453
1,500.00	4.00	333.58	1,499.84	6.25	-3.11	14,443,164.66	1,723,178.46	39.770126	-80.705462
1,550.00	5.00	333.58	1,549.68	9.76	-4.85	14,443,168.18	1,723,176.72	39.770135	-80.705468
Begin 5.00° tangent									
1,600.00	5.00	333.58	1,599.49	13.67	-6.79	14,443,172.08	1,723,174.78	39.770146	-80.705475
1,700.00	5.00	333.58	1,699.11	21.47	-10.67	14,443,179.88	1,723,170.90	39.770168	-80.705488
1,800.00	5.00	333.58	1,798.73	29.28	-14.55	14,443,187.69	1,723,167.02	39.770189	-80.705502
1,900.00	5.00	333.58	1,898.35	37.08	-18.42	14,443,195.50	1,723,163.15	39.770211	-80.705516
2,000.00	5.00	333.58	1,997.97	44.89	-22.30	14,443,203.30	1,723,159.27	39.770232	-80.705530
2,100.00	5.00	333.58	2,097.59	52.69	-26.18	14,443,211.11	1,723,155.39	39.770253	-80.705543
2,200.00	5.00	333.58	2,197.21	60.50	-30.06	14,443,218.91	1,723,151.51	39.770275	-80.705557
2,300.00	5.00	333.58	2,296.83	68.30	-33.94	14,443,226.72	1,723,147.63	39.770296	-80.705571
2,400.00	5.00	333.58	2,396.45	76.11	-37.81	14,443,234.52	1,723,143.76	39.770318	-80.705584
2,500.00	5.00	333.58	2,496.07	83.91	-41.69	14,443,242.33	1,723,139.88	39.770339	-80.705598
2,600.00	5.00	333.58	2,595.69	91.72	-45.57	14,443,250.13	1,723,136.00	39.770361	-80.705612
2,700.00	5.00	333.58	2,695.31	99.52	-49.45	14,443,257.94	1,723,132.12	39.770382	-80.705625
2,800.00	5.00	333.58	2,794.93	107.33	-53.33	14,443,265.74	1,723,128.24	39.770404	-80.705639
2,900.00	5.00	333.58	2,894.55	115.13	-57.20	14,443,273.55	1,723,124.37	39.770425	-80.705653
3,000.00	5.00	333.58	2,994.17	122.94	-61.08	14,443,281.35	1,723,120.49	39.770447	-80.705667
3,100.00	5.00	333.58	3,093.78	130.74	-64.96	14,443,289.16	1,723,116.61	39.770468	-80.705680
3,200.00	5.00	333.58	3,193.40	138.55	-68.84	14,443,296.96	1,723,112.73	39.770490	-80.705694
3,206.62	5.00	333.58	3,200.00	139.07	-69.09	14,443,297.48	1,723,112.48	39.770491	-80.705695
Begin 2°/100' build									
3,300.00	7.79	336.19	3,292.79	148.50	-73.46	14,443,306.91	1,723,108.11	39.770517	-80.705710
3,400.00	10.78	337.49	3,391.47	163.34	-79.78	14,443,321.76	1,723,101.79	39.770558	-80.705733
3,500.00	13.78	338.23	3,489.17	183.04	-87.77	14,443,341.46	1,723,093.80	39.770612	-80.705761
3,600.00	16.77	338.71	3,585.83	207.55	-97.43	14,443,365.96	1,723,084.14	39.770679	-80.705795
3,700.00	19.77	339.05	3,680.57	236.80	-108.71	14,443,395.21	1,723,072.86	39.770760	-80.705835
3,800.00	22.77	339.31	3,773.75	270.70	-121.60	14,443,429.12	1,723,059.97	39.770853	-80.705880
3,900.00	25.77	339.50	3,864.90	309.18	-136.06	14,443,467.59	1,723,045.51	39.770959	-80.705931
3,911.83	26.12	339.52	3,875.54	314.02	-137.87	14,443,472.44	1,723,043.70	39.770972	-80.705938
Begin 26.12° tangent									
4,000.00	26.12	339.52	3,954.70	350.39	-151.45	14,443,508.81	1,723,030.12	39.771072	-80.705986
4,100.00	26.12	339.52	4,044.49	391.64	-166.85	14,443,550.06	1,723,014.72	39.771186	-80.706040
4,200.00	26.12	339.52	4,134.27	432.89	-182.26	14,443,591.30	1,722,999.31	39.771299	-80.706094
4,300.00	26.12	339.52	4,224.06	474.14	-197.66	14,443,632.55	1,722,983.91	39.771412	-80.706149
4,400.00	26.12	339.52	4,313.84	515.39	-213.07	14,443,673.80	1,722,968.50	39.771526	-80.706203
4,500.00	26.12	339.52	4,403.63	556.63	-228.47	14,443,715.05	1,722,953.10	39.771639	-80.706257
4,600.00	26.12	339.52	4,493.41	597.88	-243.88	14,443,756.30	1,722,937.69	39.771753	-80.706312



Planning Report - Geographic

Database: DB_Dec2220_v16
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia.
 Site: Knob Creek
 Well: Knob Creek S-08HM (slot F)
 Wellbore: Original Hole
 Design: rev5

Local Co-ordinate Reference: Well Knob Creek S-08HM (slot F)
 TVD Reference: GL=737 @ 737.00usft
 MD Reference: GL=737 @ 737.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

RECEIVED
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 Environmental Protection

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,700.00	26.12	339.52	4,583.20	639.13	-259.28	14,443,797.54	1,722,922.29	39.771866	-80.706366
4,800.00	26.12	339.52	4,672.98	680.38	-274.88	14,443,838.79	1,722,906.89	39.771979	-80.706420
4,900.00	26.12	339.52	4,762.77	721.63	-290.09	14,443,880.04	1,722,891.48	39.772093	-80.706475
5,000.00	26.12	339.52	4,852.55	762.88	-305.49	14,443,921.29	1,722,876.08	39.772206	-80.706529
5,100.00	26.12	339.52	4,942.33	804.12	-320.90	14,443,962.54	1,722,860.67	39.772320	-80.706583
5,200.00	26.12	339.52	5,032.12	845.37	-336.30	14,444,003.79	1,722,845.27	39.772433	-80.706638
5,300.00	26.12	339.52	5,121.90	886.62	-351.71	14,444,045.03	1,722,829.86	39.772547	-80.706692
5,400.00	26.12	339.52	5,211.69	927.87	-367.11	14,444,086.28	1,722,814.46	39.772660	-80.706746
5,437.50	26.12	339.52	5,245.36	943.34	-372.89	14,444,101.75	1,722,808.68	39.772703	-80.706767
Begin 8°/100' build/turn									
5,500.00	21.20	341.76	5,302.59	966.98	-381.24	14,444,125.39	1,722,800.33	39.772768	-80.706796
5,600.00	13.45	348.55	5,397.98	995.60	-389.22	14,444,154.02	1,722,792.35	39.772846	-80.706824
5,700.00	6.33	11.39	5,496.47	1,012.43	-390.45	14,444,170.84	1,722,791.12	39.772892	-80.706828
5,800.00	5.19	98.95	5,596.12	1,017.14	-384.88	14,444,175.55	1,722,796.69	39.772905	-80.706809
5,900.00	11.90	131.23	5,695.00	1,009.83	-372.65	14,444,168.04	1,722,808.92	39.772885	-80.706765
6,000.00	19.59	139.50	5,791.19	990.05	-353.96	14,444,148.47	1,722,827.59	39.772831	-80.706899
6,100.00	27.46	143.19	5,882.81	958.79	-329.23	14,444,117.20	1,722,852.34	39.772745	-80.706611
6,200.00	35.38	145.33	5,968.08	916.45	-298.90	14,444,074.86	1,722,882.67	39.772628	-80.706504
6,300.00	43.33	146.76	6,045.34	863.85	-263.56	14,444,022.27	1,722,918.01	39.772483	-80.706379
6,383.74	50.00	147.67	6,102.77	812.66	-230.62	14,443,971.07	1,722,950.95	39.772342	-80.706262
Begin 10°/100' build/turn									
6,400.00	51.62	147.82	6,113.04	802.00	-223.89	14,443,960.42	1,722,957.68	39.772313	-80.706238
6,500.00	61.60	148.62	6,168.01	731.10	-180.01	14,443,889.51	1,723,001.56	39.772118	-80.706083
6,600.00	71.58	149.28	6,207.69	652.57	-132.75	14,443,810.98	1,723,048.82	39.771902	-80.705915
6,700.00	81.56	149.87	6,230.88	568.79	-83.57	14,443,727.21	1,723,098.00	39.771671	-80.705741
6,774.50	89.00	150.29	6,237.00	504.49	-46.56	14,443,662.90	1,723,135.01	39.771494	-80.705610
Begin 89.00° lateral									
6,800.00	89.00	150.29	6,237.44	482.34	-33.92	14,443,640.76	1,723,147.65	39.771433	-80.705566
6,900.00	89.00	150.29	6,239.18	395.51	15.64	14,443,553.92	1,723,197.21	39.771195	-80.705390
7,000.00	89.00	150.29	6,240.92	308.67	65.20	14,443,467.08	1,723,246.77	39.770956	-80.705215
7,100.00	89.00	150.29	6,242.66	221.83	114.76	14,443,380.24	1,723,296.33	39.770717	-80.705040
7,200.00	89.00	150.29	6,244.40	134.99	164.32	14,443,293.41	1,723,345.89	39.770478	-80.704864
7,300.00	89.00	150.29	6,246.14	48.15	213.87	14,443,206.57	1,723,395.44	39.770239	-80.704689
7,400.00	89.00	150.29	6,247.88	-38.68	263.43	14,443,119.73	1,723,445.00	39.770000	-80.704514
7,500.00	89.00	150.29	6,249.62	-125.52	312.99	14,443,032.89	1,723,494.56	39.769761	-80.704338
7,600.00	89.00	150.29	6,251.36	-212.36	362.55	14,442,946.05	1,723,544.12	39.769522	-80.704163
7,700.00	89.00	150.29	6,253.10	-299.20	412.11	14,442,859.22	1,723,593.68	39.769283	-80.703988
7,800.00	89.00	150.29	6,254.84	-386.04	461.67	14,442,772.38	1,723,643.24	39.769044	-80.703812
7,900.00	89.00	150.29	6,256.58	-472.88	511.23	14,442,685.54	1,723,692.80	39.768805	-80.703637
8,000.00	89.00	150.29	6,258.32	-559.71	560.79	14,442,598.70	1,723,742.36	39.768566	-80.703462
8,100.00	89.00	150.29	6,260.06	-646.55	610.35	14,442,511.86	1,723,791.92	39.768327	-80.703286
8,200.00	89.00	150.29	6,261.80	-733.39	659.91	14,442,425.02	1,723,841.48	39.768088	-80.703111
8,300.00	89.00	150.29	6,263.54	-820.23	709.47	14,442,338.19	1,723,891.04	39.767850	-80.702935
8,400.00	89.00	150.29	6,265.28	-907.07	759.03	14,442,251.35	1,723,940.59	39.767611	-80.702760
8,500.00	89.00	150.29	6,267.02	-993.90	808.58	14,442,164.51	1,723,990.15	39.767372	-80.702585
8,600.00	89.00	150.29	6,268.76	-1,080.74	858.14	14,442,077.67	1,724,039.71	39.767133	-80.702409
8,700.00	89.00	150.29	6,270.50	-1,167.58	907.70	14,441,990.83	1,724,089.27	39.766894	-80.702234
8,800.00	89.00	150.29	6,272.24	-1,254.42	957.26	14,441,904.00	1,724,138.83	39.766655	-80.702059
8,900.00	89.00	150.29	6,273.98	-1,341.26	1,006.82	14,441,817.16	1,724,188.39	39.766416	-80.701883
9,000.00	89.00	150.29	6,275.72	-1,428.09	1,056.38	14,441,730.32	1,724,237.95	39.766177	-80.701708
9,100.00	89.00	150.29	6,277.46	-1,514.93	1,105.94	14,441,643.48	1,724,287.51	39.765938	-80.701533
9,200.00	89.00	150.29	6,279.20	-1,601.77	1,155.50	14,441,556.64	1,724,337.07	39.765699	-80.701357
9,300.00	89.00	150.29	6,280.94	-1,688.61	1,205.06	14,441,469.80	1,724,386.63	39.765460	-80.701182
9,400.00	89.00	150.29	6,282.68	-1,775.45	1,254.62	14,441,382.97	1,724,436.19	39.765221	-80.701007



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Knob Creek S-08HM (slot F)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=737 @ 737.00usft
Project:	Marshall County, West Virginia.	MD Reference:	GL=737 @ 737.00usft
Site:	Knob Creek	North Reference:	Grid
Well:	Knob Creek S-08HM (slot F)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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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
9,500.00	89.00	150.29	6,284.42	-1,862.29	1,304.18	14,441,296.13	1,724,485.74	39.764982	-80.700831
9,600.00	89.00	150.29	6,286.16	-1,949.12	1,353.73	14,441,209.29	1,724,535.30	39.764743	-80.700656
9,700.00	89.00	150.29	6,287.90	-2,035.96	1,403.29	14,441,122.45	1,724,584.86	39.764504	-80.700481
9,800.00	89.00	150.29	6,289.64	-2,122.80	1,452.85	14,441,035.61	1,724,634.42	39.764265	-80.700305
9,900.00	89.00	150.29	6,291.38	-2,209.64	1,502.41	14,440,948.78	1,724,683.98	39.764027	-80.700130
10,000.00	89.00	150.29	6,293.12	-2,296.48	1,551.97	14,440,861.94	1,724,733.54	39.763788	-80.699955
10,100.00	89.00	150.29	6,294.86	-2,383.31	1,601.53	14,440,775.10	1,724,783.10	39.763549	-80.699780
10,200.00	89.00	150.29	6,296.60	-2,470.15	1,651.09	14,440,688.26	1,724,832.66	39.763310	-80.699604
10,300.00	89.00	150.29	6,298.34	-2,556.99	1,700.65	14,440,601.42	1,724,882.22	39.763071	-80.699429
10,400.00	89.00	150.29	6,300.08	-2,643.83	1,750.21	14,440,514.58	1,724,931.78	39.762832	-80.699254
10,500.00	89.00	150.29	6,301.82	-2,730.67	1,799.77	14,440,427.75	1,724,981.34	39.762593	-80.699078
10,600.00	89.00	150.29	6,303.56	-2,817.51	1,849.33	14,440,340.91	1,725,030.90	39.762354	-80.698903
10,700.00	89.00	150.29	6,305.30	-2,904.34	1,898.88	14,440,254.07	1,725,080.45	39.762115	-80.698728
10,800.00	89.00	150.29	6,307.04	-2,991.18	1,948.44	14,440,167.23	1,725,130.01	39.761876	-80.698552
10,900.00	89.00	150.29	6,308.78	-3,078.02	1,998.00	14,440,080.39	1,725,179.57	39.761637	-80.698377
11,000.00	89.00	150.29	6,310.52	-3,164.86	2,047.56	14,439,993.56	1,725,229.13	39.761398	-80.698202
11,100.00	89.00	150.29	6,312.26	-3,251.70	2,097.12	14,439,906.72	1,725,278.69	39.761159	-80.698026
11,200.00	89.00	150.29	6,314.00	-3,338.53	2,146.68	14,439,819.88	1,725,328.25	39.760920	-80.697851
11,300.00	89.00	150.29	6,315.74	-3,425.37	2,196.24	14,439,733.04	1,725,377.81	39.760681	-80.697676
11,400.00	89.00	150.29	6,317.48	-3,512.21	2,245.80	14,439,646.20	1,725,427.37	39.760442	-80.697500
11,500.00	89.00	150.29	6,319.22	-3,599.05	2,295.36	14,439,559.37	1,725,476.93	39.760204	-80.697325
11,600.00	89.00	150.29	6,320.96	-3,685.89	2,344.92	14,439,472.53	1,725,526.49	39.759965	-80.697150
11,700.00	89.00	150.29	6,322.71	-3,772.73	2,394.48	14,439,385.69	1,725,576.05	39.759726	-80.696975
11,800.00	89.00	150.29	6,324.45	-3,859.56	2,444.04	14,439,298.85	1,725,625.60	39.759487	-80.696799
11,900.00	89.00	150.29	6,326.19	-3,946.40	2,493.59	14,439,212.01	1,725,675.16	39.759248	-80.696624
12,000.00	89.00	150.29	6,327.93	-4,033.24	2,543.15	14,439,125.17	1,725,724.72	39.759009	-80.696449
12,100.00	89.00	150.29	6,329.67	-4,120.08	2,592.71	14,439,038.34	1,725,774.28	39.758770	-80.696273
12,200.00	89.00	150.29	6,331.41	-4,206.92	2,642.27	14,438,951.50	1,725,823.84	39.758531	-80.696098
12,300.00	89.00	150.29	6,333.15	-4,293.75	2,691.83	14,438,864.66	1,725,873.40	39.758292	-80.695923
12,400.00	89.00	150.29	6,334.89	-4,380.59	2,741.39	14,438,777.82	1,725,922.96	39.758053	-80.695747
12,500.00	89.00	150.29	6,336.63	-4,467.43	2,790.95	14,438,690.98	1,725,972.52	39.757814	-80.695572
12,600.00	89.00	150.29	6,338.37	-4,554.27	2,840.51	14,438,604.15	1,726,022.08	39.757575	-80.695397
12,700.00	89.00	150.29	6,340.11	-4,641.11	2,890.07	14,438,517.31	1,726,071.64	39.757336	-80.695222
12,800.00	89.00	150.29	6,341.85	-4,727.95	2,939.63	14,438,430.47	1,726,121.20	39.757097	-80.695046
12,900.00	89.00	150.29	6,343.59	-4,814.78	2,989.19	14,438,343.63	1,726,170.75	39.756858	-80.694871
13,000.00	89.00	150.29	6,345.33	-4,901.62	3,038.74	14,438,256.79	1,726,220.31	39.756619	-80.694696
13,100.00	89.00	150.29	6,347.07	-4,988.46	3,088.30	14,438,169.95	1,726,269.87	39.756380	-80.694520
13,200.00	89.00	150.29	6,348.81	-5,075.30	3,137.86	14,438,083.12	1,726,319.43	39.756142	-80.694345
13,300.00	89.00	150.29	6,350.55	-5,162.14	3,187.42	14,437,996.28	1,726,368.99	39.755903	-80.694170
13,400.00	89.00	150.29	6,352.29	-5,248.97	3,236.98	14,437,909.44	1,726,418.55	39.755664	-80.693995
13,500.00	89.00	150.29	6,354.03	-5,335.81	3,286.54	14,437,822.60	1,726,468.11	39.755425	-80.693819
13,600.00	89.00	150.29	6,355.77	-5,422.65	3,336.10	14,437,735.76	1,726,517.67	39.755186	-80.693644
13,700.00	89.00	150.29	6,357.51	-5,509.49	3,385.66	14,437,648.93	1,726,567.23	39.754947	-80.693469
13,800.00	89.00	150.29	6,359.25	-5,596.33	3,435.22	14,437,562.09	1,726,616.79	39.754708	-80.693294
13,900.00	89.00	150.29	6,360.99	-5,683.16	3,484.78	14,437,475.25	1,726,666.35	39.754469	-80.693118
14,000.00	89.00	150.29	6,362.73	-5,770.00	3,534.34	14,437,388.41	1,726,715.91	39.754230	-80.692943
14,100.00	89.00	150.29	6,364.47	-5,856.84	3,583.89	14,437,301.57	1,726,765.46	39.753991	-80.692768
14,200.00	89.00	150.29	6,366.21	-5,943.68	3,633.45	14,437,214.73	1,726,815.02	39.753752	-80.692592
14,300.00	89.00	150.29	6,367.95	-6,030.52	3,683.01	14,437,127.90	1,726,864.58	39.753513	-80.692417
14,400.00	89.00	150.29	6,369.69	-6,117.36	3,732.57	14,437,041.06	1,726,914.14	39.753274	-80.692242
14,500.00	89.00	150.29	6,371.43	-6,204.19	3,782.13	14,436,954.22	1,726,963.70	39.753035	-80.692067
14,600.00	89.00	150.29	6,373.17	-6,291.03	3,831.69	14,436,867.38	1,727,013.26	39.752796	-80.691891
14,700.00	89.00	150.29	6,374.91	-6,377.87	3,881.25	14,436,780.54	1,727,062.82	39.752557	-80.691716
14,800.00	89.00	150.29	6,376.65	-6,464.71	3,930.81	14,436,693.71	1,727,112.38	39.752318	-80.691541
14,900.00	89.00	150.29	6,378.39	-6,551.55	3,980.37	14,436,606.87	1,727,161.94	39.752079	-80.691366



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Knob Creek S-08HM (slot F)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=737 @ 737.00usft
Project:	Marshall County, West Virginia.	MD Reference:	GL=737 @ 737.00usft
Site:	Knob Creek	North Reference:	Grid
Well:	Knob Creek S-08HM (slot F)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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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	
15,000.00	89.00	150.29	6,380.13	-6,638.38	4,029.93	14,436,520.03	1,727,211.50	39.751840	-80.691190	
15,100.00	89.00	150.29	6,381.87	-6,725.22	4,079.49	14,436,433.19	1,727,261.06	39.751601	-80.691015	
15,200.00	89.00	150.29	6,383.61	-6,812.06	4,129.05	14,436,346.35	1,727,310.61	39.751363	-80.690840	
15,300.00	89.00	150.29	6,385.35	-6,898.90	4,178.60	14,436,259.51	1,727,360.17	39.751124	-80.690665	
15,400.00	89.00	150.29	6,387.09	-6,985.74	4,228.16	14,436,172.68	1,727,409.73	39.750885	-80.690489	
15,452.53	89.00	150.29	6,388.00	-7,031.35	4,254.20	14,436,127.06	1,727,435.77	39.750759	-80.690397	
PBHL/TD 15452.53 MD 6388.00 TVD										
15,452.54	89.00	150.29	6,388.00	-7,031.36	4,254.20	14,436,127.05	1,727,435.77	39.750759	-80.690397	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Knob Creek S-08HM LP - hit/miss target - Shape - Point	0.00	0.01	6,237.00	502.93	-48.55	14,443,661.34	1,723,133.02	39.771490	-80.705618	
- plan misses target center by 2.50usft at 6774.87usft MD (6237.01 TVD, 504.17 N, -46.38 E)										
Knob Creek S-08HM BH - plan hits target center - Point	0.00	0.01	6,388.00	-7,031.36	4,254.20	14,436,127.05	1,727,435.77	39.750759	-80.690397	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
1,300.00	1,300.00	0.00	0.00	KOP Begin 2°/100' build	
1,550.00	1,549.68	9.76	-4.85	Begin 5.00° tangent	
3,206.62	3,200.00	139.07	-69.09	Begin 2°/100' build	
3,911.83	3,875.54	314.02	-137.87	Begin 26.12° tangent	
5,437.50	5,245.36	943.34	-372.89	Begin 8°/100' build/turn	
6,383.74	6,102.77	812.66	-230.62	Begin 10°/100' build/turn	
6,774.50	6,237.00	504.49	-46.56	Begin 89.00° lateral	
15,452.53	6,388.00	-7,031.35	4,254.20	PBHL/TD 15452.53 MD 6388.00 TVD	



TUG HILL
OPERATING

Well Site Safety Plan

Tug Hill Operating, LLC

JM 10/29/2020

Well Name: Knob Creek S-8HM

Pad Location: Knob Creek
Wetzel County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,402,283.49

Easting: 525,226.79

October 2020

RECEIVED
Office of Oil and Gas
FEB 25 2021
WV Department of
Environmental Protection

03/19/2021

10,902' T.H.

6,672' B.H.

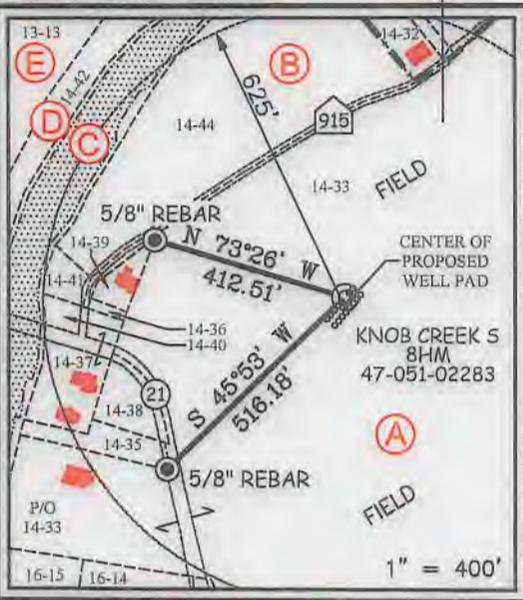
**KNOB CREEK S LEASE
WELL 8HM
TUG HILL OPERATING**

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

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)		
NAD'83 S.P.C.(FT)	N. 464,885.90	E. 1,629,676.72
NAD'83 GEO.	LAT-(N) 39.770108	LONG-(W) 80.705450
NAD'83 UTM (M)	N. 4,402,283.49	E. 525,226.79
LANDING POINT		
NAD'83 S.P.C.(FT)	N. 465,991.3	E. 1,629,638.6
NAD'83 GEO.	LAT-(N) 39.771494	LONG-(W) 80.705610
NAD'83 UTM (M)	N. 4,402,437.3	E. 525,212.6
BOTTOM HOLE		
NAD'83 S.P.C.(FT)	N. 457,782.1	E. 1,633,814.3
NAD'83 GEO.	LAT-(N) 39.750759	LONG-(W) 80.690397
NAD'83 UTM (M)	N. 4,400,140.3	E. 526,523.5

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

REFERENCES



MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
9-13-13.1	THOMAS JOHN FOX	0.827
9-14-28	CHARLES R. SCHELLHASE, ET UX	3.029
9-14-29	TINA MARIE STRICKLIN	0.209
9-14-29.1	TINA MARIE STRICKLIN	1.171
9-14-30	WILLIAM C. GROFF, ET UX	0.35
9-14-31	WILFORD F. NELSON, JR., ET UX	0.934
9-14-32	TH EXPLORATION LLC	0.583
9-14-32.1	TH EXPLORATION LLC	0.184
9-14-35	PAUL G. FOX	0.338
9-14-36	MARGARET FOX - LIFE	1600 SQ. FT.
9-14-37	MARGARET FOX - LIFE	LOT (ASSD)
9-14-38	MARGARET FOX - LIFE	0.631
9-14-39	MARGARET FOX - LIFE	8673 SQ. FT.
9-14-40	MARGARET FOX - LIFE	19,560 SQ. FT.
9-14-41	HARRY FOX, ET UX	9163 SQ. FT.
9-14-43	JAMES G. FOX	0.66
9-14-44.1	GEORGE R. TAYLOR, ET UX	4.423
9-14-51	GEORGE R. TAYLOR, ET UX	1.621
9-14-52	JAMES E. PEELMAN	0.439
9-14-53	JAMES E. PEELMAN	0.555
9-14-54	RICHARD L. HARVETH	1.649
9-16-13.2	ELEANOR M. FOX EST.	1.570
9-16-13.4	JOHN FOX	0.333
9-16-14	LYNN CAMP METHODIST CHURCH	0.762
9-16-13.1	ERIC J. YOUNG	1.98
9-16-16	CLINTON B. WHITELATCH, SR., ET UX ESTS	1 AC. 3.6/10 PO.
9-16-17	ELEANOR M. FOX EST.	0.741
9-16-18.1	ROBIN D. & DAVID G. STEWART	3.333

7,853' T.H.
14,901' B.H.

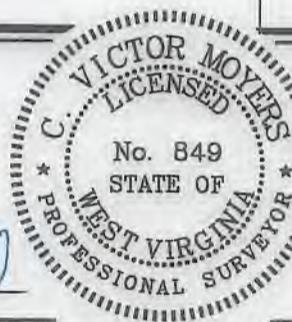
12 Vashorn Drive | P.O. Box 150 | Glenville, WV 26351 | 304.462.5634
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952
294 East Beckley Bypass | Beckley, WV 25801 | 304.255.2296
slsvv.com

B.H.

NOTES ON SURVEY

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. WERE FOUND WITHIN 825' OF THE CENTER OF PROPOSED WELL PAD.
- SEE REFERENCES FOR DWELLINGS LOCATED 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.

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 JULY 27, 20 18
REVISED 9-30-19, 8-28-20, 10-29-20, 1-25-21
OPERATORS WELL NO. KNOB CREEK S-8HM
API WELL NO. 47 - 051 - 02283 MOD PERMIT
STATE COUNTY

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8789P8HMR4.dwg
KNOB CREEK S-8HM-REV5
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

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

LOCATION:
ELEVATION 737.50' WATERSHED FISH CREEK (HUC 10)
DISTRICT MEADE COUNTY MARSHALL QUADRANGLE B.H. - WILEYVILLE 7.5'
T.H. - GLEN EASTON 7.5'

SURFACE OWNER DAVID LEE FRANKLIN ACREAGE 65.824±
ROYALTY OWNER DAVID LEE FRANKLIN, ET AL - SEE WW-6A1 ACREAGE 03/19/2021

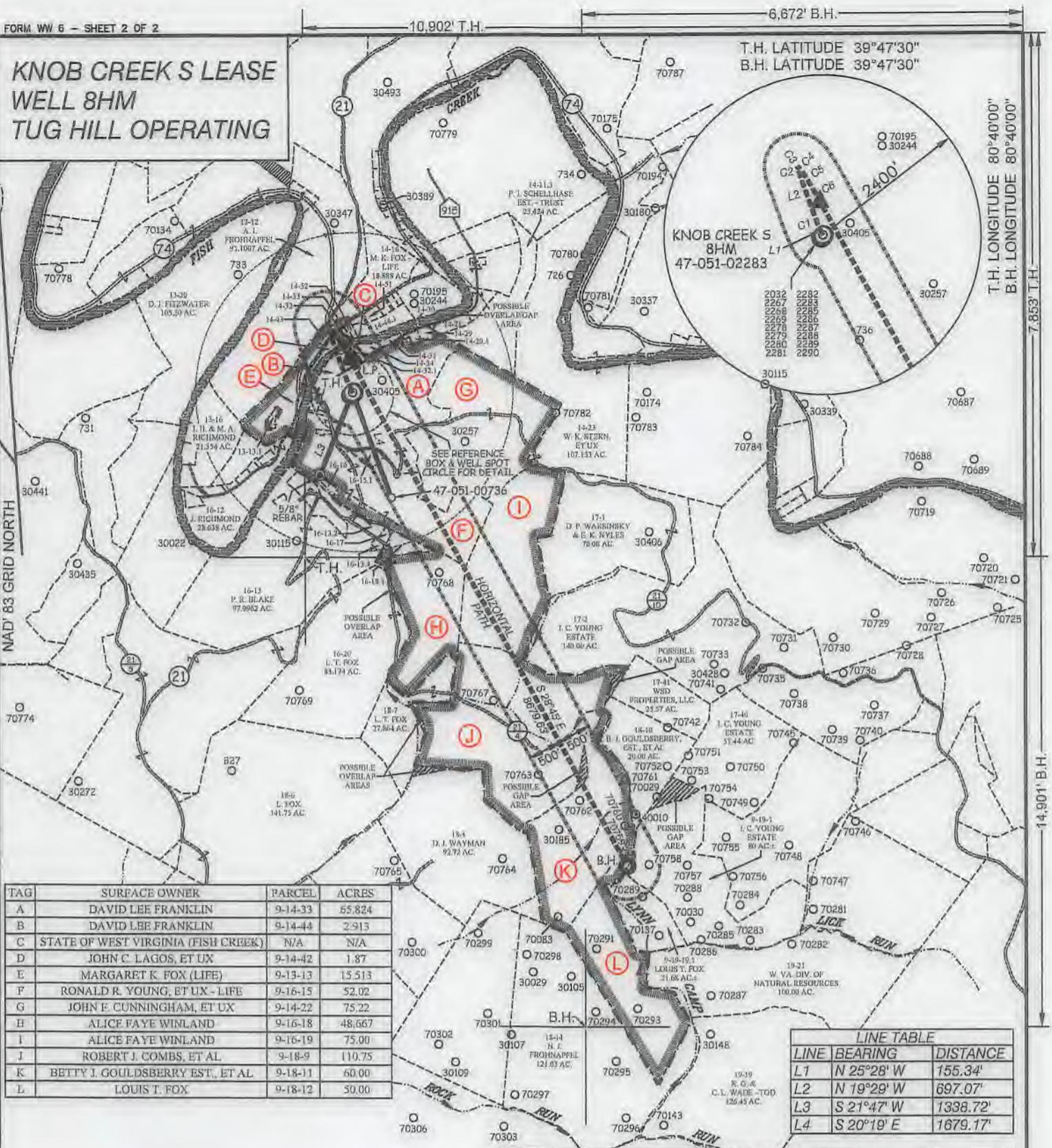
PROPOSED WORK:
DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) _____ TARGET FORMATION MARCELLUS
ESTIMATED DEPTH TVD: 6,353' / TMD: 15,453'

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

COUNTY NAME
PERMIT

**KNOB CREEK S LEASE
WELL 8HM
TUG HILL OPERATING**



TAG	SURFACE OWNER	PARCEL	ACRES
A	DAVID LEE FRANKLIN	9-14-33	65.824
B	DAVID LEE FRANKLIN	9-14-44	2.915
C	STATE OF WEST VIRGINIA (FISH CRBEK)	N/A	N/A
D	JOHN C. LAGOS, ET UX	9-14-42	1.87
E	MARGARET K. FOX (LIFE)	9-13-13	15.513
F	RONALD R. YOUNG, ET UX - LIFE	9-16-15	52.02
G	JOHN E. CUNNINGHAM, ET UX	9-14-22	75.22
H	ALICE FAYE WINLAND	9-16-18	48.667
I	ALICE FAYE WINLAND	9-16-19	75.00
J	ROBERT J. COMBS, ET AL	9-18-9	110.75
K	BETTY J. GOULDSBERRY EST., ET AL	9-18-11	60.00
L	LOUIS T. FOX	9-18-12	50.00

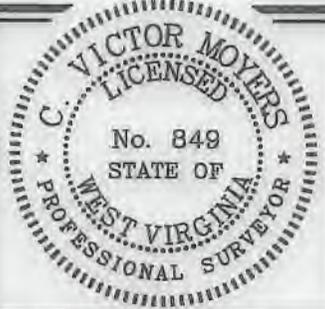
LINE	BEARING	DISTANCE
L1	N 25°28' W	155.34'
L2	N 19°29' W	697.07'
L3	S 21°47' W	1338.72'
L4	S 20°19' E	1679.17'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	188.07'	3714.66'	N 20°30' W	188.05'
C2	46.54'	166.28'	N 10°29' W	46.39'
C3	8.57'	4.42'	N 50°41' E	7.29'
C4	41.29'	126.81'	S 47°49' E	41.11'
C5	312.25'	2601.02'	S 32°56' E	312.07'
C6	263.09'	10593.76'	S 29°32' E	263.08'



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26031 | 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)			
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LANDING POINT			
NAD'83 S.P.C.(FT)	N. 485,391.3	E. 1,829,638.6	
NAD'83 GEO.	LAT-(N) 39.771494	LONG-(W) 80.705610	
NAD'83 UTM (M)	N. 4,402,437.3	E. 525,212.6	
BOTTOM HOLE			
NAD'83 S.P.C.(FT)	N. 457,782.1	E. 1,833,814.3	
NAD'83 GEO.	LAT-(N) 39.750759	LONG-(W) 80.690397	
NAD'83 UTM (M)	N. 4,400,140.3	E. 526,523.5	



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

P.S. 849 *C. Victor Moyers*

SCALE 1" = 2000' FILE NO. 8789P8HMR4.dwg
 KNOB CREEK S-8HM-REV5
 DATE JULY 27, 20 18
 REVISED 9-30-19, 8-28-20, 10-29-20, 1-25-21
 OPERATORS WELL NO. KNOB CREEK S-8HM
 API WELL NO. 47 - 051 - 02283
 NO. STATE COUNTY PERMIT

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

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)	

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

COUNTY NAME
 PERMIT

**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

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

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

Lease ID	Parcel	Tags	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*23578	9-13-13	E	DUDLEY PORTER THAYER MONTAGUE JR BY DAVID C WHITE, ESQ, GUARDIAN AD LITEM	TH EXPLORATION LLC	1/8+	1009 251	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24740	9-13-13	E	*RICARDO THOMAS MAYA	TH EXPLORATION LLC	1/8+	1025 614	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*25442	9-13-13	E	SARAH BETH PREWITT ET AL	TH EXPLORATION LLC	1/8+	1033 297	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27947	9-13-13	E	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1063 568	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23112	9-16-15	F	JOHN V AND RACHEL M SHEPHERD	TG STILES	1/8+	63 219	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16479	9-14-22	G	JOHN F CUNNINGHAM AND BERNEICE K CUNNINGHAM	FOSSIL CREEK OHIO, LLC	1/8+	826 88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.187.1	9-16-18	H	ALICE F WINLAND	TH EXPLORATION LLC	1/8+	881 133	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18424	9-16-19	I	BRENDA J LOHRUM	TH EXPLORATION LLC	1/8+	932 590	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18425	9-16-19	I	RUTH E PATSTONE AND SHERMAN W PATSTONE	TH EXPLORATION LLC	1/8+	932 592	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18426	9-16-19	I	ANDREW B COOLEY JR	TH EXPLORATION LLC	1/8+	932 595	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18427	9-16-19	I	HELEN M MOBRLEY	TH EXPLORATION LLC	1/8+	932 599	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18428	9-16-19	I	JACK R BRANNAN	TH EXPLORATION LLC	1/8+	932 597	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18509	9-16-19	I	ROGER H LOHRUM	TH EXPLORATION LLC	1/8+	933 560	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18511	9-16-19	I	PAULA J HUTCHINSON	TH EXPLORATION LLC	1/8+	933 563	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18516	9-16-19	I	DARL I TRAVIS AND MARY A TRAVIS	TH EXPLORATION LLC	1/8+	933 604	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18521	9-16-19	I	GLENN A LOHRUM AND TERRI L LOHRUM	TH EXPLORATION LLC	1/8+	933 586	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18650	9-16-19	I	MARTIN R TRAVIS AND LEIGH E TRAVIS	TH EXPLORATION LLC	1/8+	936 167	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18651	9-16-19	I	RICKY A LOHRUM	TH EXPLORATION LLC	1/8+	936 169	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18761	9-16-19	I	JOSEPH B TRAVIS	TH EXPLORATION LLC	1/8+	938 483	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18807	9-16-19	I	THOMAS F TRAVIS AND DEBORAH A TRAVIS	TH EXPLORATION LLC	1/8+	937 642	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19680	9-16-19	I	DARL L CARD AND SUSAN D CARD	TH EXPLORATION LLC	1/8+	944 443	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19866	9-16-19	I	JAMES R DIMMERLING	TH EXPLORATION LLC	1/8+	945 597	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19867	9-16-19	I	JEFFREY S DIMMERLING AND CARRIE F DIMMERLING	TH EXPLORATION LLC	1/8+	945 599	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19931	9-16-19	I	CHERYL A SALINAS	TH EXPLORATION LLC	1/8+	949 205	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21086	9-16-19	I	CHERYL L KOBUS AND EUGENE E KOBUS	TH EXPLORATION LLC	1/8+	959 308	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21925	9-16-19	I	MOUNT ST MARYS SEMINARY	TH EXPLORATION LLC	1/8+	953 515	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21958	9-16-19	I	JARRED R BARNES	TH EXPLORATION LLC	1/8+	960 18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21962	9-16-19	I	CHRISTINA S ELICSON & GEORGE T ELICSON	TH EXPLORATION LLC	1/8+	960 26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21977	9-16-19	I	SHAWN M CARD	TH EXPLORATION LLC	1/8+	960 498	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21978	9-16-19	I	ANDREW J CARD	TH EXPLORATION LLC	1/8+	960 500	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22103	9-16-19	I	DIANE M PADULA	TH EXPLORATION LLC	1/8+	953 513	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22601	9-16-19	I	SOUTH EASTERN LIEUTENANCY OF EQUESTRIAN ORDER OF THE HOLY SEPULCHRE OF JERUSALEM	TH EXPLORATION LLC	1/8+	966 473	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22814	9-16-19	I	TERRY J SCOTT	TH EXPLORATION LLC	1/8+	972 23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23112	9-16-19	I	JOHN V AND RACHEL M SHEPHERD	TG STILES	1/8+	63 219	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27947	9-16-19	I	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1063 568	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*27824	9-18-9	J	CATHARINE V B YOUNG AND A J YOUNG	J S MASON	1/8+	164 534	J S Mason to Frnk Marling: 164/571	Frank Marling to Lynn Camp Oil & Gas Company: 164/572	Lynn Camp Oil & Gas Company to Cameron Heat & Light Company: 220/423	Cameron Heat & Light Company to Zogg and Zogg Inc: 227/258	Zogg & Zogg Inc to Gerald Wells: 239/160	Gerald Wells & Hazel Wells to Paul J Klug and E J Klug: 380/359	E J Klug, Paul Klug & Lena Klug to Carl D. Perkins: 453/390	Carl D Perkins & Dorothy Louise Perkins to Perkins Oil & Gas Inc: 484/281 & 17/593	Perkins Oil & Gas Inc. to Stone Energy Corp: 26/322	Stone Energy Corp to EQT Production Company: 38/75	EQT Production Company to TH Exploration LLC: 48/21

Lease ID	Parcel	Tags	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*15938	9-18-11	K	MARK W YOHO	CHESAPEAKE APPALACHIA LLC	1/8+	695 157	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15940	9-18-11	K	JANICE N HAUDENSCHILT	CHESAPEAKE APPALACHIA LLC	1/8+	695 166	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15941	9-18-11	K	NICOLETTA MILICIA BLOODWORTH	CHESAPEAKE APPALACHIA LLC	1/8+	698 370	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15942	9-18-11	K	CLARA YOHO	CHESAPEAKE APPALACHIA LLC	1/8+	698 197	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15943	9-18-11	K	DANA MILICIA HUMPHREYS	CHESAPEAKE APPALACHIA LLC	1/8+	700 90	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15944	9-18-11	K	DEWEY A MILICIA AND ROBIN MILICIA	CHESAPEAKE APPALACHIA LLC	1/8+	700 109	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15945	9-18-11	K	HELEN V MCMASTERS AND KENNETH MCMASTERS	CHESAPEAKE APPALACHIA LLC	1/8+	707 148	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15946	9-18-11	K	JOSEPH M EMERY	CHESAPEAKE APPALACHIA LLC	1/8+	707 150	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455

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10*15947	9-18-11	K	GERALD ARTHUR EBERT	CHESAPEAKE APPALACHIA LLC	1/8+	703 588	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15948	9-18-11	K	GERALD ALLEN EBERT	CHESAPEAKE APPALACHIA LLC	1/8+	707 152	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15949	9-18-11	K	CLARENCE W EMERY	CHESAPEAKE APPALACHIA LLC	1/8+	703 590	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15950	9-18-11	K	KAREN S GIBSON	CHESAPEAKE APPALACHIA LLC	1/8+	707 154	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15951	9-18-11	K	GEORGE R FINNEGAN	CHESAPEAKE APPALACHIA LLC	1/8+	707 156	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15952	9-18-11	K	TOM A FINNEGAN	CHESAPEAKE APPALACHIA LLC	1/8+	707 135	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 23/512	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*15953	9-18-11	K	GARNET E EMERY	CHESAPEAKE APPALACHIA LLC	1/8+	708 77	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455
10*17174	9-18-11	K	JOSHUA EARL YOHO, JR.	CHESAPEAKE APPALACHIA LLC	1/8+	715 381	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 29/325	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC to SWN Production Company LLC: 19/624	SWN Production Company LLC to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455

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10*27615	9-18-11	K	*REBECCA K HICKS	TH EXPLORATION LLC	1/8+	1054 308	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*27947	9-18-11	K	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1063 568	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28158	9-18-11	K	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1068 140	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*27878	9-18-12	L	SMITH RICHMOND AND BELLE RICHMOND	EDWARD KLUG	1/8+	132 503	N/A	N/A	N/A	N/A	N/A	Paul Klug, Lena Klug, E.J Klug, et al to Carl D Perkins: 453/393	Carl D Perkins & Dorothy Louise Perkins to Perkins Oil & Gas Inc: 17/593 & 484/281	Perkins Oil & Gas Inc to Stone Energy Corp: 26/322	Stone Energy Corp to EQT Corp: 38/75	EQT Production Company to SWN Production LLC: 42/444	Equinor USA Onshore Properties Inc to TH Exploration LLC: 46/76	SWN Production Company LLC to TH Exploration LLC: 46/87
10*15937	9-19-1	M	SHIRLEY KOONTZ	CHESAPEAKE APPALACHIA LLC	1/8+	707 619	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/67	Chesapeake Appalachia LLC to SWN Production Company: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	SWN Exchange Titleholder LLC merged into SWN Production Company LLC: 19/624	SWN Production Properties Inc to TH Exploration LLC: 36/431	Statoil USA Onshore Properties Inc to TH Exploration LLC: 36/455	
10*17964	9-19-1	M	BOUNTY MINERALS LLC	TH EXPLORATION LLC	1/8+	928 418	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*22600	9-19-1	M	AIDEN BOYD YOUNG JENNIFER A YOUNG, PETITIONER	TH EXPLORATION LLC	1/8+	966 462	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28489	9-19-1	M	CAROLYN J YOUNG	TH EXPLORATION LLC	1/8+	1073 384	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28655	9-19-1	M	HOLLY A YOUNG	TH EXPLORATION LLC	1/8+	1076 59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28656	9-19-1	M	CRYSTAL DAWN YOUNG	TH EXPLORATION LLC	1/8+	1076 62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28657	9-19-1	M	PENNY YODER AND KEVIN LYNN YODER	TH EXPLORATION LLC	1/8+	1076 53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28659	9-19-1	M	MELISSA D FLETCHER & SCOTT A FLETCHER	TH EXPLORATION LLC	1/8+	1076 56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28762	9-19-1	M	ALEXA B YOUNG	TH EXPLORATION LLC	1/8+	1076 404	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28813	9-19-1	M	CLARA SUE YOUNG	TH EXPLORATION LLC	1/8+	1077 465	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28815	9-19-1	M	LELAND SINCLAIR YOUNG	TH EXPLORATION LLC	1/8+	1077 462	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28816	9-19-1	M	LOIS ELAINE WICKHAM	TH EXPLORATION LLC	1/8+	1078 10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28817	9-19-1	M	NEIL ROBERT YOUNG	TH EXPLORATION LLC	1/8+	1078 15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28819	9-19-1	M	MARK A WALKER	TH EXPLORATION LLC	1/8+	1077 35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28820	9-19-1	M	MICHAEL A WALKER	TH EXPLORATION LLC	1/8+	1077 39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*28821	9-19-1	M	CHAD A YOUNG	TH EXPLORATION LLC	1/8+	1077 37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29010	9-19-1	M	LARRY R BONAR AND DEBRA L BONAR	TH EXPLORATION LLC	1/8+	1083 555	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29011	9-19-1	M	MICHAEL S OTT AND SYBIL OTT	TH EXPLORATION LLC	1/8+	1083 559	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29012	9-19-1	M	GRANT D RICHARDS AND KERRI S RICHARDS	TH EXPLORATION LLC	1/8+	1083 551	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29014	9-19-1	M	CARLA J SIMMS	TH EXPLORATION LLC	1/8+	1084 194	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29016	9-19-1	M	SUSAN C YOUNG	TH EXPLORATION LLC	1/8+	1083 374	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29176	9-19-1	M	RONALD W YOUNG	TH EXPLORATION LLC	1/8+	1085 188	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29177	9-19-1	M	ERIC J YOUNG	TH EXPLORATION LLC	1/8+	1085 182	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29178	9-19-1	M	RONALD R YOUNG AND GERALDINE YOUNG	TH EXPLORATION LLC	1/8+	1085 185	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29237	9-19-1	M	RONALD R YOUNG	TH EXPLORATION LLC	1/8+	1090 212	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*29383	9-19-1	M	*ALICE F WINLAND	TH EXPLORATION LLC	1/8+	1090 159	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

*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.

ASSIGNMENT AND BILL OF SALE

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

RECITALS

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

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

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

ARTICLE I
DEFINED TERMS

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

ARTICLE II
ASSIGNMENT OF ASSETS

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

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

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

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WV Department of
Environmental Protection

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ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "*Assignment*") is from STATOIL USA ONSHORE PROPERTIES INC., a Delaware corporation ("*Assignor*"), to TH Exploration, LLC, a Texas limited liability company ("*Assignee*"), and is executed on August 22, 2016 (the "*Effective Date*"). Assignor and Assignee may be referred to herein collectively as the "*Parties*," or individually as a "*Party*." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated June 19, 2016 (the "*Acreage Trade Agreement*").

ARTICLE 1 ASSIGNMENT OF ASSETS

Section 1.1 Assignment. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on Exhibit A attached hereto (the "*Leases*") INsofar AND ONLY INsofar as they cover the Target Formations and INsofar AND ONLY INsofar as they cover those lands described on Exhibit A (the "*Leasehold Rights*") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "*Conveyed Assets*"). Assignor does hereby reserve unto itself the right and subsurface easement to drill through the Leasehold Rights to access the those depths and formations in the Leases other than the Target Formations and (y) to shoot seismic, sonic, or other energy or waves through the Leasehold Rights and to receive, record and evaluate such energy or waves, including those reflected from or in any way pertaining to the reserved depths, and to utilize any and all other exploration technologies that image the subsurface of the leasehold including the reserved depths and to receive, record and evaluate all images resulting therefrom.

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

Section 1.4 Assignment Subject to Acreage Trade Agreement. This Assignment is made in accordance with and is subject to the terms, covenants and conditions contained in that certain Acreage Trade Agreement. In the event of a conflict between the provisions of the Acreage Trade Agreement and this Assignment, the provisions of the Acreage Trade Agreement shall control. The execution and delivery of this Assignment by Assignor, and the execution and acceptance of this Assignment by Assignee, shall not operate to release or impair any surviving rights or obligations of either Party with respect to the other under the Acreage Trade Agreement.

ARTICLE 2 SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

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

Section 2.2 Disclaimers of Warranties and Representations.

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN SECTION VI OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR WARRANTY, EXPRESS, IMPLIED OR STATUTORY, INCLUDING AS TO (I) TITLE TO THE LEASEHOLD RIGHTS, (II) THE CONTENTS, CHARACTER OR NATURE OF ANY

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ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "**Assignment**") is from EQUINOR USA ONSHORE PROPERTIES INC., a Delaware Corporation ("**Assignor**"), to TH Exploration, LLC, a Texas limited liability company ("**Assignee**"), and is executed on August 26th, 2020 (the "**Effective Date**"). Assignor and Assignee may be referred to herein collectively as the "**Parties**," or individually as a "**Party**." Capitalized terms used herein but not otherwise defined herein (including in **Section 3.7**) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated May 18, 2020 (the "**Acreage Trade Agreement**").

ARTICLE 1
ASSIGNMENT OF ASSETS

Section 1.1 Assignment. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on **Exhibit A** attached hereto (the "**Leases**") INsofar AND ONLY INsofar as they cover those lands described on **Exhibit A** and Exhibit A-1 (the "**Leasehold Rights**") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "**Conveyed Assets**").

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

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

In the event that the Marcellus Shale Formation (as further described in the definition of "Marcellus" below) or the Utica/Point Pleasant Formation (as further described in the definition of "Utica" below) is defined within the vesting language of the Leases or any other associated documents vesting Assignor with rights in such formations to a greater extent than the definitions of "Marcellus" or "Utica" as provided in this Assignment, this Assignment shall convey all right, title, and interest into the Conveyed Depths (as listed on the attached **Exhibit A** and **Exhibit A-1**) to the greatest extent possible whether as defined in this Assignment or as defined in the Leases or any other associated documents, whichever is broader.

ARTICLE 2
SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

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

Section 2.2 Disclaimers of Warranties and Representations.

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN **SECTION VI** OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR WARRANTY, EXPRESS, IMPLIED OR STATUTORY, INCLUDING AS TO (I) TITLE TO THE LEASEHOLD RIGHTS, (II) THE CONTENTS, CHARACTER OR NATURE OF ANY DESCRIPTIVE MEMORANDUM, OR ANY REPORT OF ANY OF ITS PETROLEUM ENGINEERING CONSULTANTS, OR ANY GEOLOGICAL OR SEISMIC DATA OR INTERPRETATION, RELATING TO THE LEASEHOLD RIGHTS, (III) THE QUANTITY,

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FEB 25 2021

WV Department of
Environmental Protection

ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "*Assignment*") is from SWN PRODUCTION COMPANY, LLC, a Texas limited liability company ("*Assignor*"), to TH Exploration, LLC, a Texas limited liability company ("*Assignee*"), and is executed on August 26th, 2020 (the "*Effective Date*"). Assignor and Assignee may be referred to herein collectively as the "*Parties*," or individually as a "*Party*." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated May 18, 2020 (the "*Acreage Trade Agreement*").

ARTICLE 1 ASSIGNMENT OF ASSETS

Section 1.1 Assignment. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on Exhibit A attached hereto (the "*Leases*") IN SO FAR AND ONLY IN SO FAR as they cover those lands described on Exhibit A and Exhibit A-1 (the "*Leasehold Rights*") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "*Conveyed Assets*").

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

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

In the event that the Marcellus Shale Formation (as further described in the definition of "Marcellus" below) or the Utica/Point Pleasant Formation (as further described in the definition of "Utica" below) is defined within the vesting language of the Leases or any other associated documents vesting Assignor with rights in such formations to a greater extent than the definitions of "Marcellus" or "Utica" as provided in this Assignment, this Assignment shall convey all right, title, and interest into the Conveyed Depths (as listed on the attached Exhibit A and Exhibit A-1) to the greatest extent possible whether as defined in this Assignment or as defined in the Leases or any other associated documents, whichever is broader.

ARTICLE 2 SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

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

Section 2.2 Disclaimers of Warranties and Representations.

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN SECTION VI OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR WARRANTY, EXPRESS, IMPLIED OR STATUTORY, INCLUDING AS TO (I) TITLE TO THE LEASEHOLD RIGHTS, (II) THE CONTENTS, CHARACTER OR NATURE OF ANY DESCRIPTIVE MEMORANDUM, OR ANY REPORT OF ANY OF ITS PETROLEUM ENGINEERING CONSULTANTS, OR ANY GEOLOGICAL OR SEISMIC DATA OR INTERPRETATION, RELATING TO THE LEASEHOLD RIGHTS, (III) THE QUANTITY,

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