



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

Tuesday, December 28, 2021
PERMIT MODIFICATION APPROVAL
New Drill / Modification

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BOLEVARD, PLAZA II
SUITE 200
CANONSBURG, PA 15371

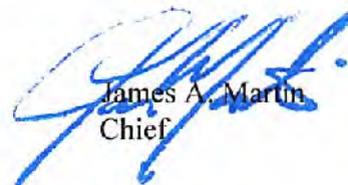
Re: Permit Modification Approval for BRECKENRIDGE S-10HM
47-051-02346

Extending Lateral, Drilling Deeper. Updated Total Vertical Depth 7115' to 7126', Total Measured Depth 8940' to 15013'. Updated Casing Plan and Lease Chain.

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: BRECKENRIDGE S-10HM
Farm Name: CNX LAND LLC
U.S. WELL NUMBER: 47-051-02346
New Drill Modification
Date Modification Issued: 12/21/2021

Promoting a healthy environment.

12/31/2021

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 Cameron Glen Easton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Breckenridge S-10HM Well Pad Name: Breckenridge

3) Farm Name/Surface Owner: CNX Land, LLC Public Road Access: CR 62

4) Elevation, current ground: 1,380' Elevation, proposed post-construction: 1,370.10'

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 6,974' - 7,026', thickness of 52' and anticipated pressure of approx. 3800 psi.

8) Proposed Total Vertical Depth: 7,126'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 15,013'

11) Proposed Horizontal Leg Length: 7,301.28'

12) Approximate Fresh Water Strata Depths: 70; 1,048'

13) Method to Determine Fresh Water Depths: Based on the depth of Pittsburgh Coal seam, per WVGES mapping contours

14) Approximate Saltwater Depths: 1,515'

15) Approximate Coal Seam Depths: Sewickley Coal - 952' and Pittsburgh Coal - 1,042'

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

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

(a) If Yes, provide Mine Info: Name: Marshall County Mine

Depth: Pittsburgh coal - 1,042'; subsea level - 328'

Seam: Pittsburgh

Owner: Marshall County Coal Resources, Inc.

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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/Coal	13 3/8"	NEW	J55	54.5#	1,150'	1,150' ✓	1149ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	3,011'	3,011' ✓	1000ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	15,013'	15,013' ✓	3837ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#	7,062'		
Liners							

B.S. 10-14-21

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/ Coal	13 3/8"	17 1/2"	.38	2,740	2,192	SEE #24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE #24	1.19
Production	5 1/2"	8 7/8" _ 8 3/4"	.361	12,640	10,112	SEE #24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

PACKERS

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

WW-6B
(10/14)

API NO. 47-051 - C2346
OPERATOR WELL NO. Breckenridge S-10HM
Well Pad Name: Breckenridge

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

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

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

Well to be completed with approximately 18,250,000 lb proppant and 330,000 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

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21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 45.50 acres

22) Area to be disturbed for well pad only, less access road (acres): 8.21 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

*Note: Attach additional sheets as needed.



Tug Hill Operating, LLC Casing and Cement Program

Breckenridge S-10HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	1,150'	CTS
Intermediate	9 5/8"	J55	12 1/4"	3,011'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	15,013'	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 ppg, Y=1.38

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 14.5 ppg, Y = 1.3

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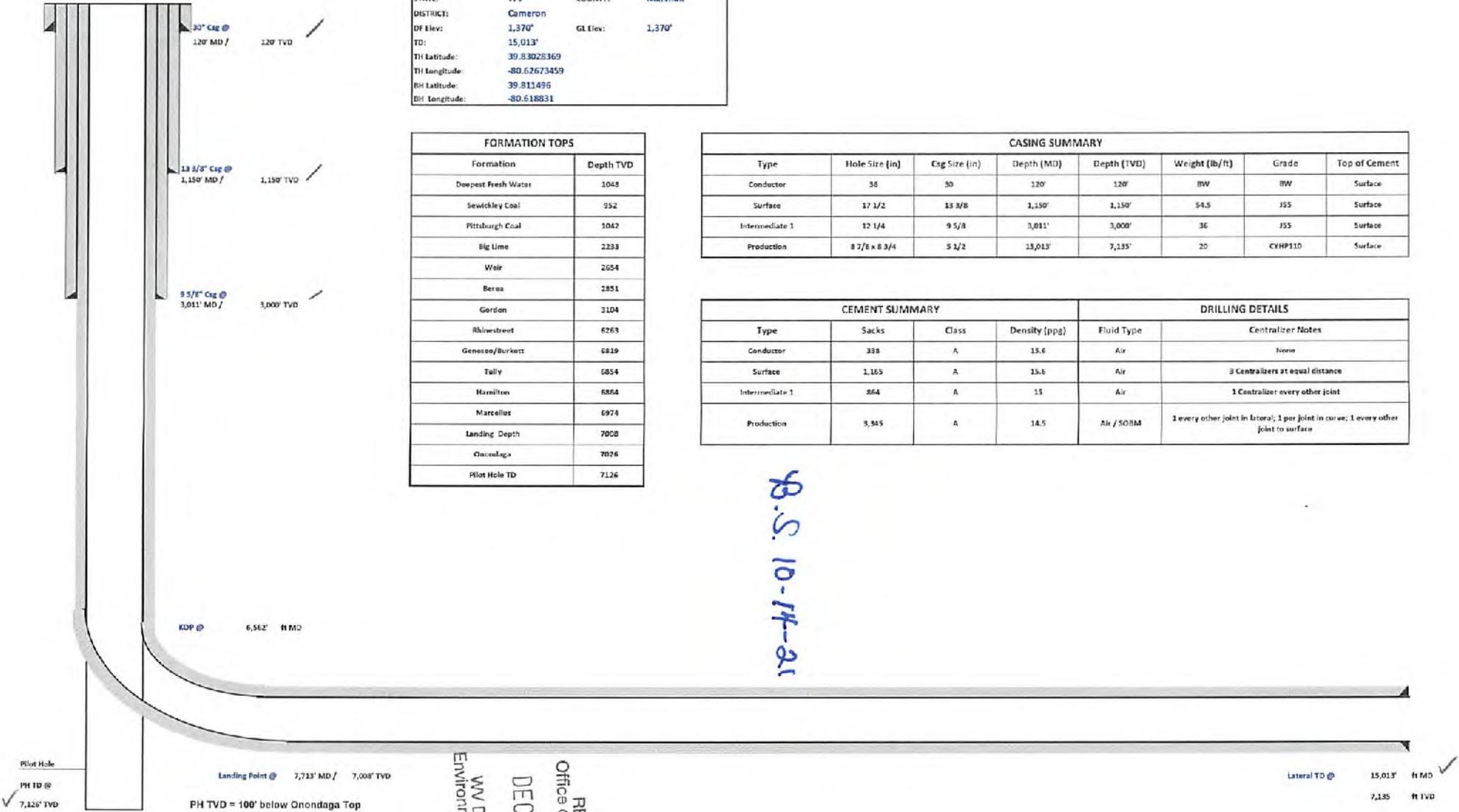
WELL NAME: Breckenridge S-10HM
STATE: WV **COUNTY:** Marshall
DISTRICT: Cameron
DF Elev: 1,370' **GL Elev:** 1,370'
TD: 15,013'
TH Latitude: 39.83028369
TH Longitude: -80.62673459
BH Latitude: 39.811496
BH Longitude: -80.618831

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1048
Sewickley Coal	952
Pittsburgh Coal	1042
Big Lime	2233
Weir	2654
Berea	2851
Gordon	3104
Rhinestreet	6263
Genesee/Burket	6819
Tully	6854
Hamilton	6884
Marcellus	6974
Landing Depth	7008
Onondaga	7026
Pilot Hole TD	7126

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 1/2	13 3/8	1,150'	1,150'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	3,011'	3,000'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	15,013'	7,135'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Type	Sacks	Class	Density (ppg)	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,163	A	15.6	Air	8 Centralizers at equal distance
Intermediate 1	864	A	15	Air	1 Centralizer every other joint
Production	3,345	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other joint to surface

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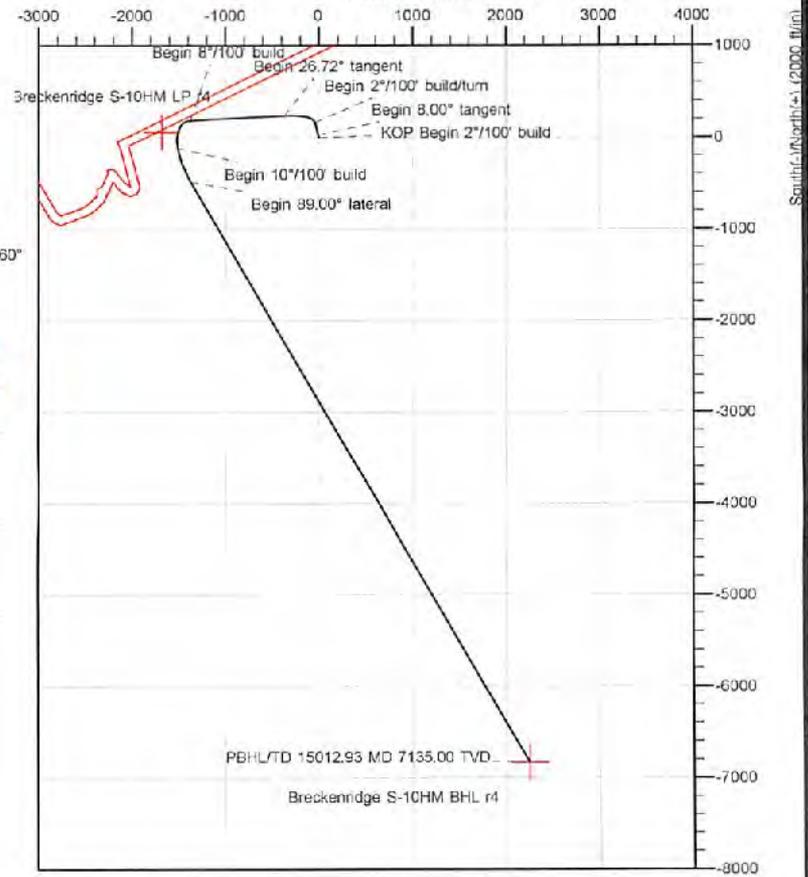
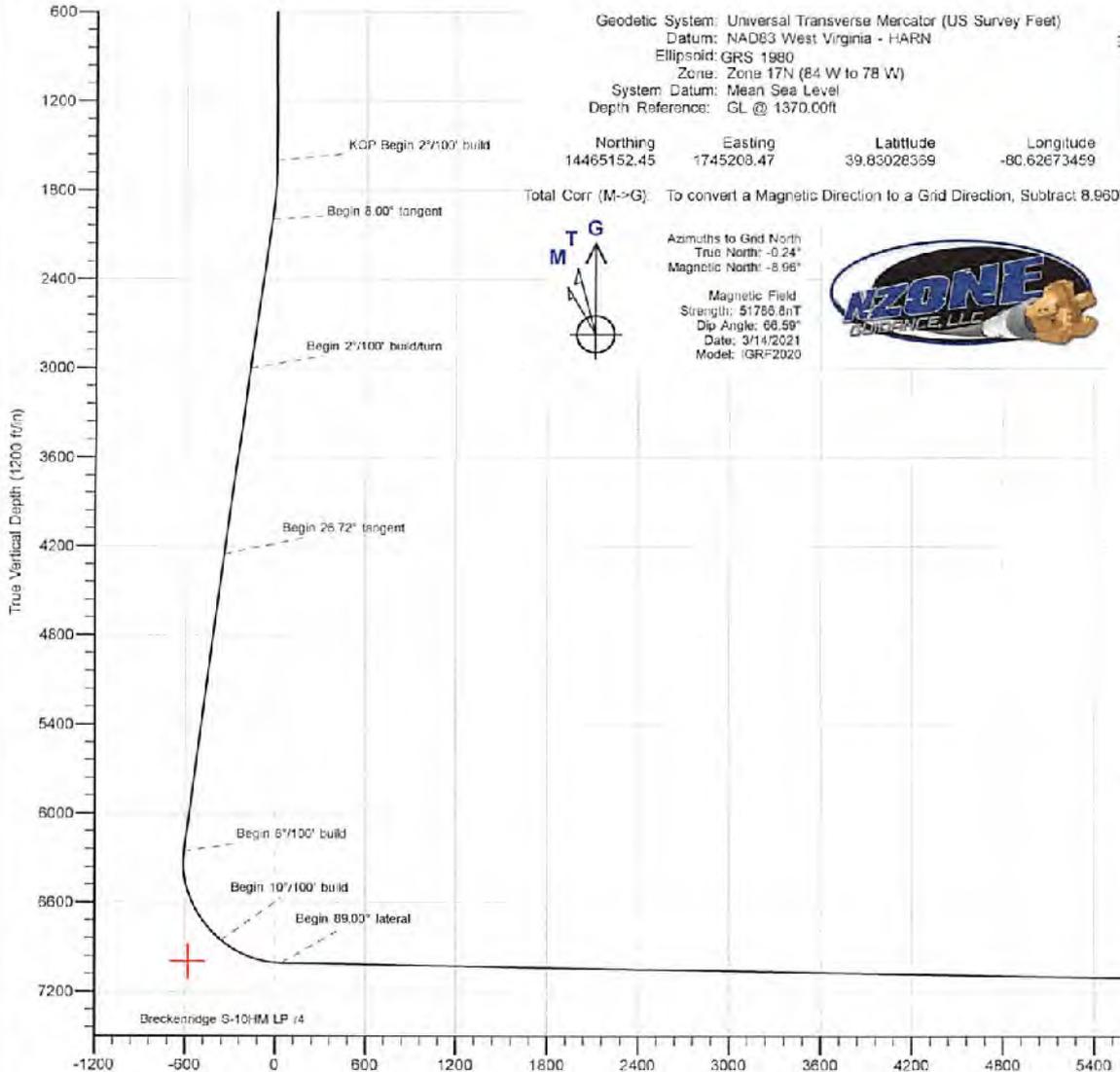
Well: Breckenridge S-10 HM (slot P)
Site: Breckenridge (1 row)
Project: Marshall County, West Virginia
Design: rev4
Rig:

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
Breckenridge S-10HM LP r4	6997.00	56.88	-1680.91	14465209.33	1743527.56	39.83045900	-80.63272100
- plan misses target center by 279.69ft at 7235.17ft MD (6826.86 TVD, -87.76 N, -1510.52 E)							
Breckenridge S-10HM BHL r4	7135.00	-6831.83	2248.04	14458320.64	1747456.50	39.81149600	-80.61883100
- plan hits target center							

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	1600.00	0.00	0.00	1600.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	2000.00	8.00	345.00	1988.70	25.93	-7.22	2.00	345.000	-27.84	Begin 8.00° tangent
4	3011.14	8.00	345.00	3000.00	162.86	-43.64	0.00	0.000	-168.34	Begin 2°/100' build/turn
5	4318.58	26.72	267.10	4253.10	237.16	-356.34	2.00	-94.032	-339.78	Begin 26.72° tangent
6	6562.34	26.72	267.10	6257.30	186.11	-1373.84	3.00	0.000	-306.21	Begin 8°/100' build
7	7276.28	50.00	171.90	5856.04	-113.33	-1506.80	3.00	-114.707	-358.53	Begin 10°/100' build
8	7712.95	89.00	150.30	7007.60	-491.85	-1368.30	10.00	-32.214	39.52	Begin 89.00° lateral
9	15012.93	89.00	150.30	7135.00	-6831.83	2248.04	0.00	0.000	7192.19	PBHLTD 15012.93 MD 7135.00 TV



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Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Breckenridge S-10 HM (slot P)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1370.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1370.00ft
Site:	Breckenridge (1 row)	North Reference:	Grid
Well:	Breckenridge S-10 HM (slot P)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

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

Site	Breckenridge (1 row)				
Site Position:		Northing:	14,465,184.76 usft	Latitude:	39.83037401
From:	Lat/Long	Easting:	1,745,068.18 usft	Longitude:	-80.82723379
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "		

Well	Breckenridge S-10 HM (slot P)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,152.46 usft	Latitude:	39.83028369
	+E/-W	0.00 ft	Easting:	1,745,208.47 usft	Longitude:	-80.62673459
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,370.00 ft	
Grid Convergence:						

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	3/14/2021	-8.721	68.586	51,786.82934768

Design	rev4			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	161.79

Plan Survey Tool Program		Date		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	15.012.93 rev4 (Original Hole)		

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Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Breckenridge S-10 HM (slot P)
Company:	Tug Hill Operating LLC	TVD Reference:	CL @ 1370.00ft
Project:	Marshall County, West Virginia	MD Reference:	CL @ 1370.00ft
Site:	Breckenridge (1 row)	North Reference:	Grid
Well:	Breckenridge S-10 HM (slot P)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.000	
2,000.00	8.00	345.00	1,998.70	26.93	-7.22	2.00	2.00	0.00	345.000	
3,011.14	8.00	345.00	3,000.00	162.66	-43.64	0.00	0.00	0.00	0.000	
4,318.58	26.72	267.10	4,253.10	237.16	-366.34	2.00	1.43	-5.96	-94.032	
5,562.34	26.72	267.10	6,257.30	186.11	-1,373.84	0.00	0.00	0.00	0.000	
7,276.29	50.00	171.90	6,856.04	-118.38	-1,506.80	8.00	3.26	-13.33	-114.707	
7,712.96	89.00	150.30	7,007.60	-491.85	-1,368.30	10.00	8.93	-4.95	-32.214	
15,012.93	89.00	150.30	7,135.00	-6,831.83	2,248.04	0.00	0.00	0.00	0.000	Breckenridge S-10HM



Planning Report - Geographic

Database: DB_Dec2220_v16
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Breckenridge (1 row)
 Well: Breckenridge S-10 HM (slot P)
 Wellbore: Original Hole
 Design: rev4

Local Co-ordinate Reference: Well Breckenridge S-10 HM (slot P)
 TVD Reference: GL @ 1370.00ft
 MD Reference: GL @ 1370.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
100.00	0.00	0.00	100.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
200.00	0.00	0.00	200.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
300.00	0.00	0.00	300.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
400.00	0.00	0.00	400.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
500.00	0.00	0.00	500.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
600.00	0.00	0.00	600.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
700.00	0.00	0.00	700.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
800.00	0.00	0.00	800.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
900.00	0.00	0.00	900.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,465,152.46	1,745,208.47	39.83028369	-80.62673459	
KOP Begin 2°/100' build										
1,700.00	2.00	345.00	1,699.98	1.69	-0.45	14,465,154.14	1,745,208.01	39.83028633	-80.62673617	
1,800.00	4.00	345.00	1,799.84	6.74	-1.81	14,465,159.20	1,745,206.66	39.83030222	-80.62674092	
1,900.00	6.00	345.00	1,899.45	15.19	-4.06	14,465,167.82	1,745,204.40	39.83032537	-80.62674883	
2,000.00	8.00	345.00	1,998.70	26.93	-7.22	14,465,179.39	1,745,201.25	39.83035773	-80.62675969	
Begin 8.00° tangent										
2,100.00	8.00	345.00	2,097.73	40.37	-10.82	14,465,192.83	1,745,197.65	39.83039469	-80.62677252	
2,200.00	8.00	345.00	2,196.76	53.82	-14.42	14,465,206.27	1,745,194.05	39.83043185	-80.62678515	
2,300.00	8.00	345.00	2,295.78	67.26	-18.02	14,465,219.72	1,745,190.44	39.83046861	-80.62679778	
2,400.00	8.00	345.00	2,394.81	80.70	-21.82	14,465,233.16	1,745,186.84	39.83050557	-80.62681041	
2,500.00	8.00	345.00	2,493.84	94.15	-25.23	14,465,246.60	1,745,183.24	39.83054252	-80.62682304	
2,600.00	8.00	345.00	2,592.86	107.59	-28.83	14,465,260.05	1,745,179.64	39.83057948	-80.62683567	
2,700.00	8.00	345.00	2,691.89	121.03	-32.43	14,465,273.49	1,745,176.04	39.83061644	-80.62684830	
2,800.00	8.00	345.00	2,790.92	134.47	-36.03	14,465,286.93	1,745,172.43	39.83065340	-80.62686094	
2,900.00	8.00	345.00	2,889.94	147.92	-39.63	14,465,300.37	1,745,168.83	39.83069036	-80.62687357	
3,000.00	8.00	345.00	2,888.97	161.38	-43.24	14,465,313.82	1,745,165.23	39.83072732	-80.62688620	
3,011.14	8.00	345.00	3,000.00	162.86	-43.64	14,465,315.31	1,745,164.83	39.83073143	-80.62688760	
Begin 2°/100' build/turn										
3,100.00	8.07	332.27	3,086.00	174.35	-48.14	14,465,326.81	1,745,160.32	39.83076306	-80.62690347	
3,200.00	8.60	318.92	3,186.95	186.20	-56.32	14,465,338.66	1,745,152.15	39.83079569	-80.62693243	
3,300.00	9.52	307.63	3,285.71	196.89	-67.78	14,465,349.35	1,745,140.68	39.83082517	-80.62697310	
3,400.00	10.74	298.58	3,384.15	206.40	-82.52	14,465,358.05	1,745,125.95	39.83085145	-80.62702544	
3,500.00	12.16	291.50	3,482.16	214.72	-100.50	14,465,367.17	1,745,107.96	39.83087450	-80.62708939	
3,600.00	13.73	285.94	3,579.62	221.84	-121.72	14,465,374.29	1,745,086.74	39.83089430	-80.62716486	
3,700.00	15.40	281.53	3,676.41	227.75	-146.14	14,465,380.21	1,745,062.32	39.83091081	-80.62725176	
3,800.00	17.13	277.98	3,772.41	232.45	-173.74	14,465,384.90	1,745,034.72	39.83092403	-80.62734999	
3,900.00	18.92	275.07	3,867.49	235.92	-204.48	14,465,388.38	1,745,003.98	39.83093393	-80.62745643	
4,000.00	20.74	272.65	3,961.56	238.18	-238.33	14,465,390.63	1,744,970.14	39.83094050	-80.62757995	
4,100.00	22.60	270.61	4,054.49	239.20	-275.23	14,465,391.66	1,744,933.23	39.83094373	-80.62771139	
4,200.00	24.47	268.87	4,146.17	238.99	-315.16	14,465,391.45	1,744,893.31	39.83094363	-80.62785360	
4,300.00	26.36	267.36	4,236.49	237.56	-358.05	14,465,390.02	1,744,850.42	39.83094018	-80.62800641	
4,318.58	26.72	267.10	4,253.10	237.16	-386.34	14,465,389.62	1,744,842.13	39.83093917	-80.62803594	
Begin 26.72° tangent										
4,400.00	26.72	267.10	4,325.83	235.31	-402.90	14,465,387.76	1,744,805.56	39.83093450	-80.62816620	
4,500.00	26.72	267.10	4,415.16	233.03	-447.80	14,465,385.49	1,744,760.66	39.83092877	-80.62832617	
4,600.00	26.72	267.10	4,504.48	230.76	-492.71	14,465,383.21	1,744,715.76	39.83092303	-80.62848615	
4,700.00	26.72	267.10	4,593.80	228.48	-537.61	14,465,380.94	1,744,670.86	39.83091730	-80.62864612	



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Breckenridge S-10 HM (slot P)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1370.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1370.00ft
Site:	Breckenridge (1 row)	North Reference:	Grid
Well:	Breckenridge S-10 HM (slot P)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,800.00	26.72	267.10	4,683.13	225.21	-582.51	14,465,376.66	1,744,625.95	39.83091156	-80.62880609
4,900.00	26.72	267.10	4,772.45	223.93	-627.41	14,465,376.39	1,744,581.05	39.83090583	-80.62896606
5,000.00	26.72	267.10	4,861.77	221.66	-672.32	14,465,374.11	1,744,536.15	39.83090009	-80.62912604
5,100.00	26.72	267.10	4,951.10	219.38	-717.22	14,465,371.84	1,744,491.25	39.83089435	-80.62928601
5,200.00	26.72	267.10	5,040.42	217.11	-762.12	14,465,369.56	1,744,446.35	39.83088862	-80.62944598
5,300.00	26.72	267.10	5,129.74	214.83	-807.02	14,465,367.29	1,744,401.44	39.83088288	-80.62960595
5,400.00	26.72	267.10	5,219.06	212.56	-851.93	14,465,365.01	1,744,356.54	39.83087714	-80.62976593
5,500.00	26.72	267.10	5,308.39	210.28	-896.83	14,465,362.74	1,744,311.64	39.83087140	-80.62992590
5,600.00	26.72	267.10	5,397.71	208.01	-941.73	14,465,360.46	1,744,266.74	39.83086567	-80.63008587
5,700.00	26.72	267.10	5,487.03	205.73	-986.63	14,465,358.19	1,744,221.83	39.83085993	-80.63024584
5,800.00	26.72	267.10	5,576.36	203.46	-1,031.54	14,465,355.91	1,744,176.93	39.83085419	-80.63040582
5,900.00	26.72	267.10	5,665.68	201.18	-1,076.44	14,465,353.64	1,744,132.03	39.83084845	-80.63056579
6,000.00	26.72	267.10	5,755.00	198.91	-1,121.34	14,465,351.36	1,744,087.13	39.83084271	-80.63072576
6,100.00	26.72	267.10	5,844.33	196.63	-1,166.24	14,465,349.09	1,744,042.22	39.83083697	-80.63088573
6,200.00	26.72	267.10	5,933.65	194.36	-1,211.15	14,465,346.81	1,743,997.32	39.83083124	-80.63104571
6,300.00	26.72	267.10	6,022.97	192.08	-1,256.05	14,465,344.54	1,743,952.42	39.83082550	-80.63120568
6,400.00	26.72	267.10	6,112.29	189.81	-1,300.95	14,465,342.26	1,743,907.52	39.83081976	-80.63136565
6,500.00	26.72	267.10	6,201.62	187.53	-1,345.85	14,465,339.99	1,743,862.62	39.83081402	-80.63152562
6,562.34	26.72	267.10	6,257.30	186.11	-1,373.84	14,465,338.57	1,743,834.62	39.83081044	-80.63152535
Begin 8°/100' build									
6,600.00	25.59	280.75	6,291.11	184.38	-1,390.33	14,465,336.83	1,743,818.14	39.83080586	-80.63158410
6,650.00	24.56	251.63	6,336.41	179.36	-1,410.86	14,465,331.82	1,743,797.60	39.83079232	-80.63175731
6,700.00	24.12	241.97	6,381.99	171.28	-1,429.75	14,465,323.74	1,743,778.72	39.83077034	-80.63182471
6,750.00	24.30	232.22	6,427.61	160.18	-1,446.91	14,465,312.63	1,743,761.56	39.83074003	-80.63188598
6,800.00	25.08	222.81	6,473.05	145.09	-1,462.25	14,465,298.55	1,743,746.22	39.83070154	-80.63194082
6,850.00	26.41	214.12	6,518.11	129.11	-1,475.69	14,465,281.56	1,743,732.78	39.83065504	-80.63198896
6,900.00	28.22	206.34	6,562.54	109.30	-1,487.18	14,465,261.76	1,743,721.29	39.83060077	-80.63203017
6,950.00	30.42	199.50	6,606.15	85.76	-1,496.66	14,465,239.22	1,743,711.81	39.83053899	-80.63206425
7,000.00	32.92	193.56	6,648.71	61.61	-1,504.07	14,465,214.07	1,743,704.40	39.83047001	-80.63209103
7,050.00	35.67	188.40	6,690.02	33.97	-1,509.39	14,465,186.43	1,743,699.08	39.83039416	-80.63211038
7,100.00	38.62	183.91	6,729.88	3.97	-1,512.59	14,465,156.43	1,743,695.88	39.83031180	-80.63212221
7,150.00	41.71	179.98	6,768.09	-28.25	-1,513.65	14,465,124.21	1,743,694.82	39.83022335	-80.63212646
7,200.00	44.92	176.50	6,804.47	-62.51	-1,512.56	14,465,089.94	1,743,695.90	39.83012922	-80.63212310
7,250.00	48.23	173.40	6,838.84	-98.67	-1,509.34	14,465,053.78	1,743,699.12	39.83002939	-80.63211216
7,276.29	50.00	171.90	6,856.04	-118.38	-1,506.80	14,465,034.08	1,743,701.67	39.82997574	-80.63210339
Begin 10°/100' build									
7,300.00	52.02	170.30	6,870.96	-138.59	-1,503.94	14,465,015.87	1,743,704.52	39.82992570	-80.63209348
7,350.00	56.34	167.19	6,900.22	-176.33	-1,496.00	14,464,976.13	1,743,712.47	39.82981649	-80.63206578
7,400.00	60.73	164.38	6,926.32	-217.64	-1,485.51	14,464,934.81	1,743,722.96	39.82970290	-80.63202901
7,450.00	65.17	161.80	6,949.06	-260.22	-1,472.54	14,464,892.23	1,743,735.93	39.82958582	-80.63198344
7,500.00	69.65	159.40	6,968.27	-303.75	-1,457.20	14,464,848.71	1,743,751.27	39.82946612	-80.63192943
7,550.00	74.17	157.14	6,983.79	-347.88	-1,439.60	14,464,804.58	1,743,768.87	39.82934473	-80.63186739
7,600.00	78.70	154.98	6,995.52	-392.28	-1,419.87	14,464,760.17	1,743,788.59	39.82922256	-80.63179778
7,650.00	83.26	152.88	7,003.35	-436.63	-1,398.16	14,464,715.83	1,743,810.29	39.82910054	-80.63172115
7,700.00	87.82	150.83	7,007.24	-480.57	-1,374.67	14,464,671.89	1,743,833.80	39.82897961	-80.63163806
7,712.96	89.00	150.30	7,007.60	-491.85	-1,368.30	14,464,660.61	1,743,840.17	39.82894655	-80.63161555
Begin 89.00° lateral									
7,800.00	89.00	150.30	7,008.12	-567.44	-1,325.18	14,464,585.02	1,743,863.29	39.82874047	-80.63146308
7,900.00	89.00	150.30	7,010.87	-654.29	-1,275.64	14,464,498.17	1,743,932.82	39.82850140	-80.63128790
8,000.00	89.00	150.30	7,012.81	-741.14	-1,226.10	14,464,411.32	1,743,962.36	39.82826233	-80.63111273
8,100.00	89.00	150.30	7,014.36	-827.99	-1,176.57	14,464,324.47	1,744,031.90	39.82802326	-80.63093756
8,200.00	89.00	150.30	7,016.10	-914.84	-1,127.03	14,464,237.62	1,744,081.44	39.82776419	-80.63076239
8,300.00	89.00	150.30	7,017.85	-1,001.69	-1,077.49	14,464,150.77	1,744,130.98	39.82754513	-80.63058722
8,400.00	89.00	150.30	7,019.59	-1,088.54	-1,027.95	14,464,063.92	1,744,180.52	39.82730606	-80.63041205

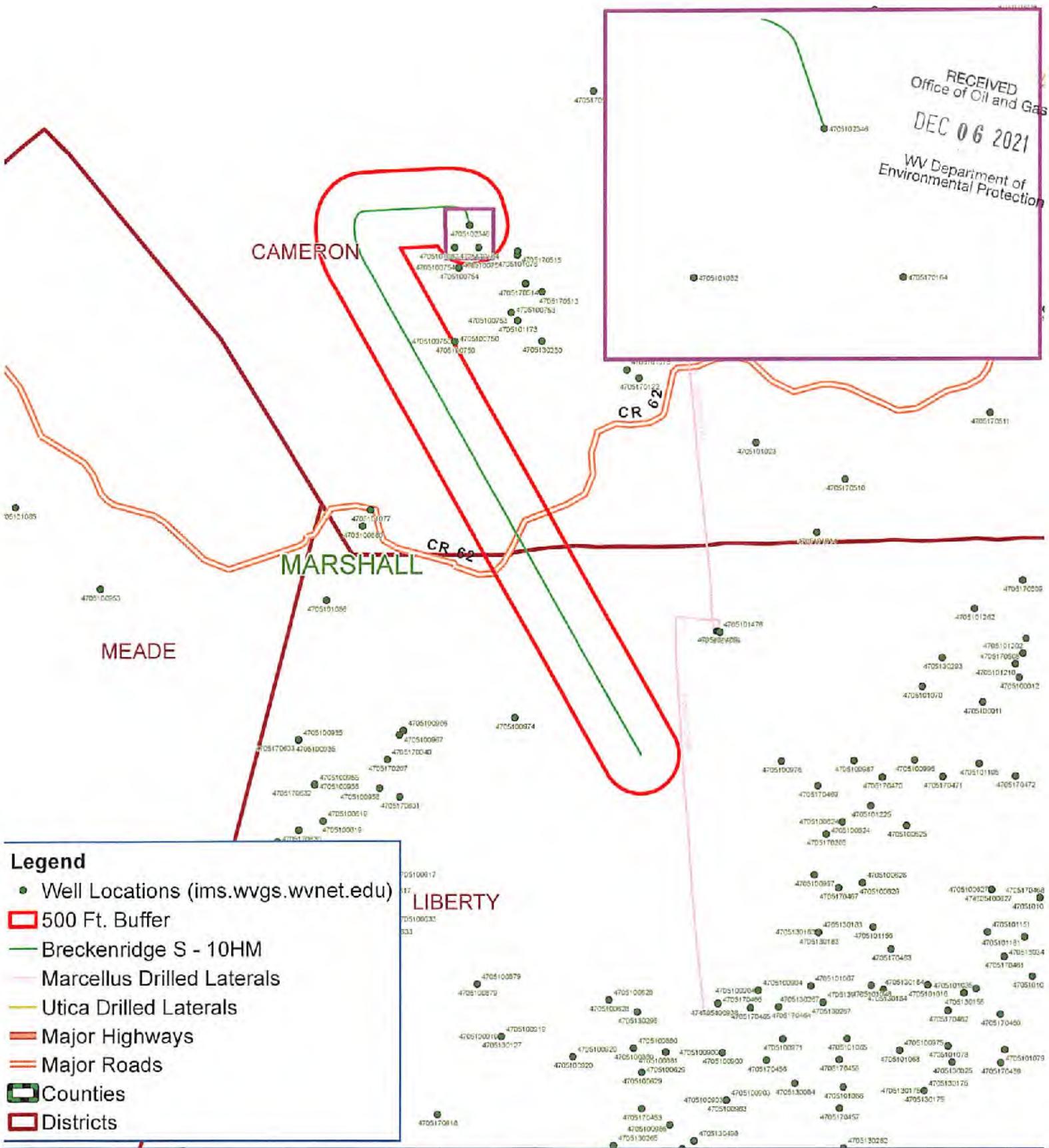


Planning Report - Geographic

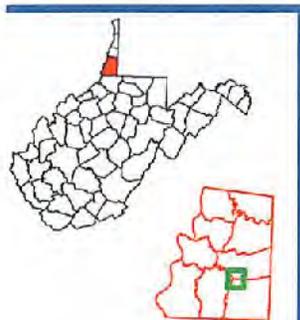
Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Breckenridge S-10 HM (slot P)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1370.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1370.00ft
Site:	Breckenridge (1 row)	North Reference:	Grid
Well:	Breckenridge S-10 HM (slot P)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
8,500.00	89.00	150.30	7,021.34	-1,175.39	-978.41	14,463,877.07	1,744,230.06	39.82706699	-80.63023688	
8,600.00	89.00	150.30	7,023.08	-1,262.24	-928.87	14,463,890.22	1,744,279.60	39.82682792	-80.63006172	
8,700.00	89.00	150.30	7,024.83	-1,349.09	-879.33	14,463,803.37	1,744,329.14	39.82658835	-80.62988655	
8,800.00	89.00	150.30	7,026.57	-1,435.94	-829.79	14,463,716.52	1,744,378.68	39.82634978	-80.62971139	
8,900.00	89.00	150.30	7,028.32	-1,522.79	-780.25	14,463,629.67	1,744,428.21	39.82611071	-80.62953623	
9,000.00	89.00	150.30	7,030.07	-1,609.54	-730.71	14,463,542.82	1,744,477.75	39.82597154	-80.62936107	
9,100.00	89.00	150.30	7,031.81	-1,695.48	-681.17	14,463,455.98	1,744,527.29	39.82583257	-80.62918591	
9,200.00	89.00	150.30	7,033.56	-1,783.33	-631.63	14,463,369.13	1,744,576.83	39.82569349	-80.62901075	
9,300.00	89.00	150.30	7,035.30	-1,870.18	-582.10	14,463,282.28	1,744,626.37	39.82555442	-80.62883559	
9,400.00	89.00	150.30	7,037.05	-1,957.03	-532.56	14,463,195.43	1,744,675.91	39.82541535	-80.62866044	
9,500.00	89.00	150.30	7,038.79	-2,043.88	-483.02	14,463,108.58	1,744,725.45	39.82527628	-80.62848528	
9,600.00	89.00	150.30	7,040.54	-2,130.73	-433.48	14,463,021.73	1,744,774.99	39.82513721	-80.62831013	
9,700.00	89.00	150.30	7,042.28	-2,217.58	-383.94	14,462,934.88	1,744,824.53	39.82499813	-80.62813498	
9,800.00	89.00	150.30	7,044.03	-2,304.43	-334.40	14,462,848.03	1,744,874.07	39.82485906	-80.62795982	
9,900.00	89.00	150.30	7,045.77	-2,391.28	-284.86	14,462,761.18	1,744,923.61	39.82471999	-80.62778467	
10,000.00	89.00	150.30	7,047.52	-2,478.13	-235.32	14,462,674.33	1,744,973.14	39.82458091	-80.62760953	
10,100.00	89.00	150.30	7,049.26	-2,564.98	-185.78	14,462,587.48	1,745,022.68	39.82444184	-80.62743438	
10,200.00	89.00	150.30	7,051.01	-2,651.83	-136.24	14,462,500.63	1,745,072.22	39.82430277	-80.62725923	
10,300.00	89.00	150.30	7,052.75	-2,738.68	-86.70	14,462,413.78	1,745,121.76	39.82416369	-80.62708409	
10,400.00	89.00	150.30	7,054.50	-2,825.53	-37.17	14,462,326.93	1,745,171.30	39.82402462	-80.62690894	
10,500.00	89.00	150.30	7,056.24	-2,912.38	12.37	14,462,240.09	1,745,220.84	39.82388554	-80.62673380	
10,600.00	89.00	150.30	7,057.99	-2,999.23	61.91	14,462,153.24	1,745,270.38	39.82374647	-80.62655866	
10,700.00	89.00	150.30	7,059.73	-3,086.08	111.45	14,462,066.39	1,745,319.92	39.82360739	-80.62638352	
10,800.00	89.00	150.30	7,061.48	-3,172.93	160.99	14,461,979.54	1,745,369.46	39.82346832	-80.62620838	
10,900.00	89.00	150.30	7,063.22	-3,259.78	210.53	14,461,892.69	1,745,419.00	39.82332924	-80.62603324	
11,000.00	89.00	150.30	7,064.97	-3,346.62	260.07	14,461,805.84	1,745,468.53	39.82319017	-80.62585810	
11,100.00	89.00	150.30	7,066.71	-3,433.47	309.61	14,461,718.99	1,745,518.07	39.82305109	-80.62568297	
11,200.00	89.00	150.30	7,068.46	-3,520.32	359.15	14,461,632.14	1,745,567.61	39.82291201	-80.62550784	
11,300.00	89.00	150.30	7,070.20	-3,607.17	408.69	14,461,545.29	1,745,617.15	39.82277294	-80.62533270	
11,400.00	89.00	150.30	7,071.95	-3,694.02	458.23	14,461,458.44	1,745,666.69	39.82263386	-80.62515757	
11,500.00	89.00	150.30	7,073.69	-3,780.87	507.76	14,461,371.59	1,745,716.23	39.82249478	-80.62498244	
11,600.00	89.00	150.30	7,075.44	-3,867.72	557.30	14,461,284.74	1,745,765.77	39.82235570	-80.62480731	
11,700.00	89.00	150.30	7,077.18	-3,954.57	606.84	14,461,197.89	1,745,815.31	39.82221663	-80.62463218	
11,800.00	89.00	150.30	7,078.93	-4,041.42	656.38	14,461,111.04	1,745,864.85	39.82207755	-80.62445706	
11,900.00	89.00	150.30	7,080.67	-4,128.27	705.92	14,461,024.19	1,745,914.39	39.82193847	-80.62428193	
12,000.00	89.00	150.30	7,082.42	-4,215.12	755.46	14,460,937.33	1,745,963.92	39.82179939	-80.62410680	
12,100.00	89.00	150.30	7,084.17	-4,301.97	805.00	14,460,850.48	1,746,013.46	39.82166031	-80.62393168	
12,200.00	89.00	150.30	7,085.91	-4,388.82	854.54	14,460,763.63	1,746,063.00	39.82152123	-80.62375656	
12,300.00	89.00	150.30	7,087.66	-4,475.67	904.08	14,460,676.78	1,746,112.54	39.82138215	-80.62358144	
12,400.00	89.00	150.30	7,089.40	-4,562.52	953.62	14,460,589.93	1,746,162.08	39.82124307	-80.62340632	
12,500.00	89.00	150.30	7,091.15	-4,649.37	1,003.16	14,460,503.08	1,746,211.62	39.82110399	-80.62323120	
12,600.00	89.00	150.30	7,092.89	-4,736.22	1,052.70	14,460,416.23	1,746,261.16	39.82096491	-80.62305608	
12,700.00	89.00	150.30	7,094.64	-4,823.07	1,102.23	14,460,329.38	1,746,310.70	39.82082583	-80.62288097	
12,800.00	89.00	150.30	7,096.38	-4,909.92	1,151.77	14,460,242.53	1,746,360.24	39.82068675	-80.62270585	
12,900.00	89.00	150.30	7,098.13	-4,996.76	1,201.31	14,460,155.68	1,746,409.78	39.82054767	-80.62253074	
13,000.00	89.00	150.30	7,099.87	-5,083.61	1,250.85	14,460,068.83	1,746,459.31	39.82040859	-80.62235563	
13,100.00	89.00	150.30	7,101.62	-5,170.46	1,300.39	14,459,982.00	1,746,508.85	39.82026951	-80.62218051	
13,200.00	89.00	150.30	7,103.36	-5,257.31	1,349.93	14,459,895.15	1,746,558.39	39.82013043	-80.62200540	
13,300.00	89.00	150.30	7,105.11	-5,344.16	1,399.47	14,459,808.30	1,746,607.93	39.82000135	-80.62183030	
13,400.00	89.00	150.30	7,106.85	-5,431.01	1,449.01	14,459,721.45	1,746,657.47	39.81986227	-80.62165519	
13,500.00	89.00	150.30	7,108.60	-5,517.86	1,498.55	14,459,634.61	1,746,707.01	39.81972319	-80.62148008	
13,600.00	89.00	150.30	7,110.34	-5,604.71	1,548.09	14,459,547.76	1,746,756.55	39.81958411	-80.62130498	
13,700.00	89.00	150.30	7,112.09	-5,691.56	1,597.63	14,459,460.91	1,746,806.09	39.81944503	-80.62112987	
13,800.00	89.00	150.30	7,113.83	-5,778.41	1,647.16	14,459,374.05	1,746,855.63	39.81930595	-80.62095477	
13,900.00	89.00	150.30	7,115.58	-5,865.26	1,696.70	14,459,287.21	1,746,905.17	39.81916688	-80.62077967	

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DEC 06 2021
WV Department of
Environmental Protection



- Legend**
- Well Locations (ims.wvgs.wvnet.edu)
 - ▭ 500 Ft. Buffer
 - Breckenridge S - 10HM
 - Marcellus Drilled Laterals
 - Utica Drilled Laterals
 - Major Highways
 - Major Roads
 - ▭ Counties
 - ▭ Districts



Breckenridge S - 10HM Cameron District Marshall County, WV



Map Prepared by:
DPS
LAND SERVICES

12/31/2021

Area of Review

Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

Data Sources Reviewed:

1. Enverus and RS Energy Group Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Adam Picard 724-485-9331, apicard@dpslandservices.com, DPS GIS (09/29/2021) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it is the best publicly available. See attached map he provided.

Request maps for:

1. Wellbore with Enverus All Wells Layer
2. Map with Farm lines overlain and any well spots identified on Farm Maps
3. More recent (1970s vintage) topos and older topos

Discussion with Phil Dinterman WVGES GIS Department (7/15/2016)

- WVGES has plotted every well spot they have access to and are aware of with that contains a coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some locations aren't great due to vintage and manipulation of maps through time
- 30000 series – any well drilled prior to 1929 – APIs were not assigned to original wells
- 70000 series – Well spots pulled from old Farm line maps that the WVGES has access to
- 90000 series – Any sources that the WVGES has access that shows a well spot but has no additional supporting information. DEP does not have 90000 series on their maps.
- There can be duplication between wells in the 3 series
- Phil indicated that other Operators are providing a screenshot of the WVGES map with their planned well and using that for permits

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WV Department of
Environmental Protection

Wells within 500' Buffer

Note: Well spots depicted on Area of Review map are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots.

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705101082	Consolidation Coal Co.	unknown	unknown	unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be affected by fracturing in the planned Marcellus well. Well is plugged.	Well was plugged 7/3/2008.
4705170164	Hope Natural Gas Company	2374' TVD	Big Injun	unknown	No, the well is not deep enough to be within the expected fracture propagation from a Marcellus stimulation.	
4705102346	Tug Hill Operating, LLC	7115' TVD (proposed)	none	none	Yes, this is a proposed well in the Marcellus. Once completed the well will be within the expected fracture propagation from a Marcellus stimulation. Proper casing and cement should prevent migration of fluids between wellbores.	A Tug Hill Operating, LLC permitted well on the pad that is not drilled or perforated.
4705100754	Consolidation Coal Co.	2965' TVD	Gordon	unknown	No, the well is not deep enough to be within the expected fracture propagation from a Marcellus stimulation. Well is plugged.	Well was plugged 8/29/2008.

WV Geological & Economic Survey

Well: County = 51 Permit = 01082

Report Time: Friday, August 27, 2021 4:10:01 PM

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4705101082	Marshall	1082	Cameron	Glen Easton	Cameron	39.829496	-80.627436	531880.9	4408899.7

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4705101082	7/3/2008	Plugging	Completed	J Richard Wayt		M-1334				Consolidation Coal Co			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD	G_BEF	G_AF
4705101082	7/3/2008	6/18/2008	1262	Ground Level				unclassified	unclassified	not available	unknown	unknown						

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

Stratigraphy Information:

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV	DATUM
4705101082	Plugging	Pittsburgh coal	Well Record	946	Reasonable	5	Reasonable	1262	Ground Level

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

Plugging Information:

API	PLG_DT	DEPTH_PBT
4705101082	7/3/2008	0

There is no Sample data for this well

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 DEC 06 2021
 WV Department of
 Environmental Protection

WV Geological & Economic Survey

Well: County = 51 Permit = 70164

Report Time: Friday, August 27, 2021 4:11:58 PM

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4705170164	Marshall	70164	Liberty	Glen Easton	Cameron	39.829496	-80.626308	531977.5	4408900.1

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4705170164	-/-		Original Loc	Completed	Elijah Williams	1	547			Hope Natural Gas Company			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD	G_BEF	G_AFT
4705170164	-/-	-/-	1420	Barometer	Big Injun (undiff)	Big Injun (undiff)		unclassified	unclassified	not available	unknown	unknown	2374			2374		

WV Geological & Economic Survey

Well: County = 51 Permit = 02346

Report Time: Friday, August 27, 2021 4:12:17 PM

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4705102346	Marshall	2346	Cameron	Glen Easton	Cameron	39.830284	-80.626735	531940.6	4408987.3

Bottom Hole Location Information:

API	EP_FLAG	UTME	UTMN	LON_DD	LAT_DD
4705102346	1	As Proposed	532233.1	4408596.4	-80.623336 39.826751

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4705102346	-/-		Dvtd Wrkd Ovr	Permitted	CNX Land LLC		S-10HM	Breckenridge		Hasans Ventures et al	Tug Hill Operating, LLC	7115	Marcellus Fm

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD	G_BEF	G_AFT	O_BEF
4705102346	-/-	-/-	1380	Ground Level															

WV Geological & Economic Survey

Well: County = 51 Permit = 00760

Report Time: Thursday, September 30, 2021 2:08:53 PM

Well Reassignment Information: Reassigned From

OLD_COUNTY	OLD_PERMIT	NEW_COUNTY	NEW_PERMIT
51	70042	51	750

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_16	LAT_DD	LON_DD	UTME	UTMN
4705100750	Marshall	750	Meade	Glen Easton	Cameron	39.825161	-80.827436	531882.5	4408529.5

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM
4705100750	8/29/2009	Plugging	Completed	Cherise D & Sonya Strope			M-107			Consolidation Coal Co		
4705100750	---	Original Loc	Completed	Cox & Kerns	1					Cameron Heat & Light		
4705100750	---	Walked Over	Permitted	O E Buge/ Luster Kerns	1		Cox & Kerns		O E Buge/ Luster Kerns/ O Scroggins	Cameron Gas Co.		

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD	G_BEF	G
4705100750	---	8/13/2005	1057	Ground Level			unclassified	Unsuccessful	not available	unknown	unknown						
4705100750	---	---	1179	Topo Estimation	Cameron-Gamer	Hampshire Grp	Gordon	Development Well	Gas w/ Oil Show	Cable Tool	Nat/Open H	2965		2965			0
4705100750	---	---	1179	Topo Estimation			Gordon Stray	unclassified	Gas	unknown	unknown	2955					

Pay/Show/Water Information:

API	CMP_DT	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOT	FM_BOT	G_BEF	G_AFT	O_BEF	O_AFT	WATER_QNTY
4705100750	---	Show	Oil	Vertical			2000	Big Injun (PriceSeq)	0	0			
4705100750	---	Pay	Gas	Vertical	2754	Gordon Stray	2760	Gordon Stray	0	0			

Production Gas Information: (Volumes in Mcf)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705100750	Cameron Oil and Gas Co.	1993	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Cameron Gas Co.	1994													
4705100750	Cameron Gas Co.	1995													
4705100750	Coleman, C R.	1996													
4705100750	Mountaineer Gas Services, Inc.	1997	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	1999	2,356	0	0	0	0	0	0	0	0	0	0	2,356	0
4705100750	Mountaineer Gas Services, Inc.	2001	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	2002	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	2003	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Leatherwood, Inc.	2006	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Consolidation Coal Co.	2007	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705100750	Cameron Oil and Gas Co.	1993	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Cameron Gas Co.	1994													
4705100750	Cameron Gas Co.	1995													
4705100750	Coleman, C R.	1996													
4705100750	Mountaineer Gas Services, Inc.	1997	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	2001	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	2002	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	2003	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Mountaineer Gas Services, Inc.	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Leatherwood, Inc.	2006	0	0	0	0	0	0	0	0	0	0	0	0	0
4705100750	Consolidation Coal Co.	2007	0	0	0	0	0	0	0	0	0	0	0	0	0

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

There is no Production Water data for this well

Stratigraphy Information

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV DATUM
4705100750	Plugging	Pittsburgh coal	Well Record	776	Reasonable		6 Reasonable	1170 Ground Level

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

Plugging Information:

API	PLG_DT	DEPTH_PBT
4705100750	8/29/2008	0

There is no Sample data for this well



TUG HILL
OPERATING

Well Site Safety Plan
Part A – Site Specific Data and Figures

Well Name: Breckenridge S-10HM

Pad Name: Breckenridge

County: Marshall

UTM (meters), NAD83, Zone 17

Northing: 4,408,987.29

Easting: 531,940.61

B.S. 10-14-21

**KEY CONTACT FOR WELL SITE SAFETY PLAN
DEVELOPMENT AND MAINTENANCE**

Jerry V. DeRosa, Director EH&S Affairs

(724) 338-2029 (office)

(412) 736-5767 (cellular)

24-HOUR EMERGENCY PHONE NUMBER

(800) 921-9745

12/31/2021

**BRECKENRIDGE S LEASE
WELL 10HM
TUG HILL OPERATING**

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

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

NAD'83 S.P.C.(FT)	N. 486,516.05	E. 1,652,075.57
NAD'83 GEO.	LAT-(N) 39.830284	LONG-(W) 80.826735
NAD'83 UTM (M)	N. 4,408,987.29	E. 531,940.61

LANDING POINT

NAD'83 S.P.C.(FT)	N. 486,047.0	E. 1,650,698.8
NAD'83 GEO.	LAT-(N) 39.828949	LONG-(W) 80.831616
NAD'83 UTM (M)	N. 4,408,837.4	E. 531,523.5

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 479,645.3	E. 1,654,209.8
NAD'83 GEO.	LAT-(N) 39.811496	LONG-(W) 80.818831
NAD'83 UTM (M)	N. 4,406,904.9	E. 532,625.8

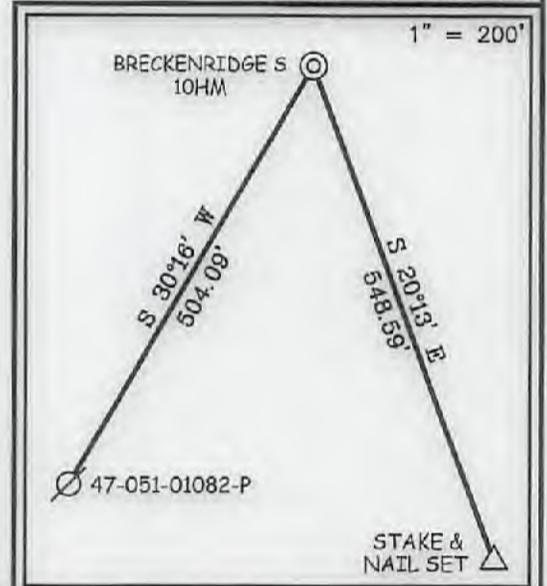
T.H. LONGITUDE 80°37'30"
B.H. LONGITUDE 80°35'00"
T.H. 1,111'
B.H. 7,955'

TAG	SURFACE OWNER	PARCEL	ACRES
A	CNX LAND, LLC	3-19-76	53.25
B	CNX LAND, LLC	3-19-74	44.59
C	CNX LAND, LLC	3-19-78	30.927
D	SONJA J. STROPE	3-19-77	46.783
E	NANCY L. PARSONS - LIFE	7-1-7	40.86
F	SONJA J. STROPE	3-18-3	74.757
G	CAROL J. EVANS - LIFE	3-18-3.1	1.173
H	MOLLY KAY HUBBS COLLINS, ET AL	7-1-11	98.44
I	MOLLY KAY HUBBS COLLINS, ET AL	7-1-15	57.32

MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
7-1-6	NANCY L. PARSONS - LIFE	1.00
7-1-7.1	NANCY L. PARSONS	0.50
7-1-8	NANCY L. PARSONS - LIFE	33.00
7-1-10	NANCY L. PARSONS - LIFE	1.00



REFERENCES



NOTES ON SURVEY

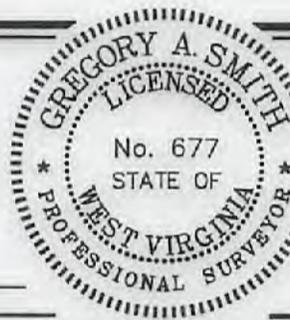
- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1" = 2000'



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
slsw.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. *Gregory A. Smith*
677



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
DATE NOVEMBER 10, 20 20
REVISED OCTOBER 13, 20 21
OPERATORS WELL NO. BRECKENRIDGE S-10HM
API WELL NO. 47 - 051 - 02346
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 9026P10HMR.dwg
BRECKENRIDGE S-10HM REV4
HORIZONTAL & VERTICAL CONTROL DETERMINED BY: DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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



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

LOCATION: GROUND = 1,385.80' PROPOSED = 1,370.10' WATERSHED GRAVE CREEK (HUC 10) & LAUREL RUN
DISTRICT CAMERON COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER CNX LAND LLC ACREAGE 53.25±
ROYALTY OWNER HASAN'S VENTURES, ET AL ACREAGE 53.25±
PROPOSED WORK: LEASE NO. SEE WW-6A1

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: 7,126' / TMD: 15,013'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DARREN BROWN - CT CORPORATION
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5098 WASHINGTON ST. W, STE 407
FORT WORTH, TX 76107 CHARLESTON, WV 25313-1561

COUNTY NAME
PERMIT

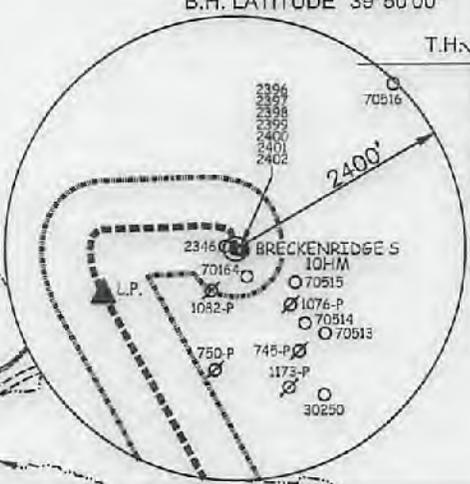
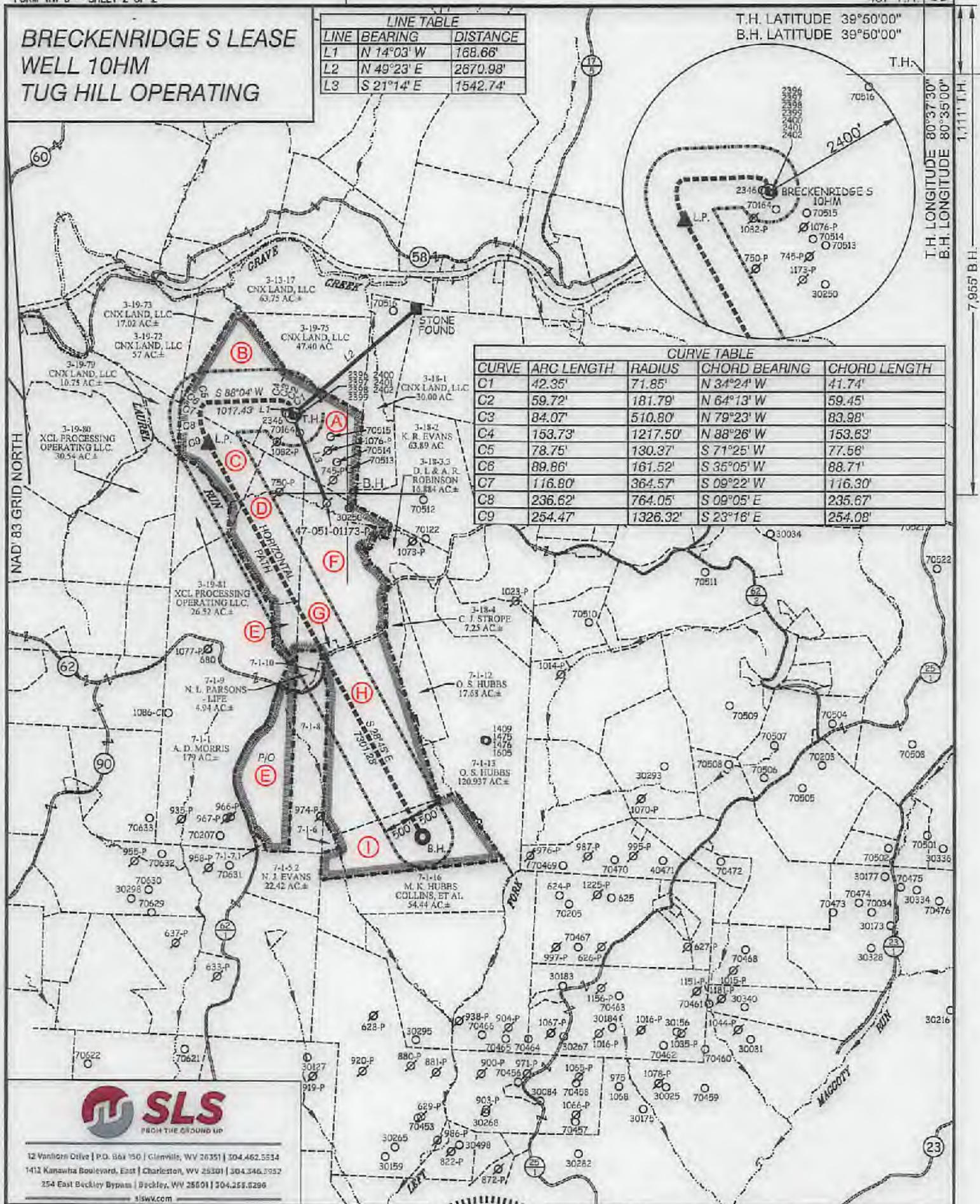
**BRECKENRIDGE S LEASE
WELL 10HM
TUG HILL OPERATING**

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 14°03' W	168.66'
L2	N 49°23' E	2670.98'
L3	S 21°14' E	1542.74'

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

T.H. LONGITUDE 80°37'30"
B.H. LONGITUDE 80°35'00"

7,955' B.H.



CURVE TABLE				
CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	42.35'	71.85'	N 34°24' W	41.74'
C2	59.72'	181.79'	N 64°13' W	59.45'
C3	84.07'	510.80'	N 79°23' W	83.98'
C4	153.73'	1217.50'	N 88°26' W	153.63'
C5	78.75'	130.37'	S 71°25' W	77.58'
C6	89.86'	161.52'	S 35°05' W	88.71'
C7	116.80'	364.57'	S 09°22' W	116.30'
C8	236.62'	764.05'	S 09°05' E	235.67'
C9	254.47'	1326.32'	S 23°18' E	254.08'



12 Vanlore Drive | P.O. Box 150 | Glenville, WV 26031 | 304.462.5534
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.5952
254 East Beckley Bypass | Beckley, WV 26001 | 304.255.6296
slsw.com



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

P.S. 677 *Gregory A. Smith*

LEGEND	
LEASE LINE	
SURFACE LINE	
WELL LATERAL	
OFFSET LINE	
TIE LINE	
CREEK	
ROAD	
COUNTY ROUTE	
PROPOSED WELL	
EXISTING WELL	
PERMITTED WELL	
TAX MAP-PARCEL	00-00
SURFACE OWNER (SEE TABLE)	
LEASE # (SEE WW-6A1)	

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)			
NAD'83 S.P.C. (FT)	N. 485,516.05	E. 1,652,075.57	
NAD'83 GEO.	LAT-(N) 39.830284	LONG-(W) 80.628735	
NAD'83 UTM (M)	N. 4,408,987.29	E. 531,940.81	
LANDING POINT			
NAD'83 S.P.C. (FT)	N. 466,047.0	E. 1,650,698.8	
NAD'83 GEO.	LAT-(N) 39.828949	LONG-(W) 80.631616	
NAD'83 UTM (M)	N. 4,408,837.4	E. 531,523.5	
BOTTOM HOLE			
NAD'83 S.P.C. (FT)	N. 479,645.3	E. 1,654,209.8	
NAD'83 GEO.	LAT-(N) 39.811496	LONG-(W) 80.618831	
NAD'83 UTM (M)	N. 4,409,904.9	E. 532,625.8	

SCALE 1" = 2000' FILE NO. 9026P10HMR.dwg
BRECKENRIDGE S-10HM REV4
DATE NOVEMBER 10, 20 20
REVISED OCTOBER 13, 20 21
OPERATORS WELL NO. BRECKENRIDGE S-10HM
API WELL NO. 47-051-02346
STATE COUNTY PERMIT

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

WELL OPERATOR TUG HILL OPERATING, LLC	DESIGNATED AGENT DARREN BROWN - CT CORPORATION
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107	ADDRESS 5098 WASHINGTON ST. W. STE 407 CHARLESTON, WV 25313-1561

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

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

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

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

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

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

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

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

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

Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*31241	3-19-76	A	JAMES R. WAYT, CONVEYED ON 12/3/2013 TO MERIDIUS VENTURES, LLC AND HASAN'S VENTURES, LLC IN DB 811/494	TRANS ENERGY INC AND REPUBLIC PARTNERS VI LP	1/8+	729 40	N/A	N/A	N/A	N/A	N/A	Trans Energy Inc to Republic Energy Ventures LLC: 24/260	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to TH Exploration LLC: 48/21
10*31242	3-19-76	A	EVELYN L. BUTLER, CONVEYED ON 12/3/2013 TO MERIDIUS VENTURES, LLC AND HASAN'S VENTURES, LLC IN DB 811/494	TRANS ENERGY INC AND REPUBLIC PARTNERS VI LP	1/8+	729 49	N/A	N/A	N/A	N/A	N/A	Trans Energy Inc to Republic Energy Ventures LLC: 24/260	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to TH Exploration LLC: 48/21
10*38613	3-19-74	B	KATHERINE ZOGG OLIVER	GREAT LAKES ENERGY PARTNERS LLC	1/8+	663 449	Name Change - Great Lakes Energy Partners LLC to Range Resources - Appalachia, LLC: CB 19/443	Range Resources - Appalachia LLC to Chesapeake Appalachia LLC & Statoil USA Onshore Properties Inc: 23/368	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/363	Chesapeake Appalachia LLC to SWN Production Company LLC: 33/110	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 33/424	Merger - SWN Exchange Titleholder LLC into SWN Production Company LLC: CB 19/624	SWN Production Company LLC to TH Exploration LLC: 49/635	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/604 American Petroleum Partners Operating LLC to TH Exploration LLC: 43/503
10*25525	3-19-78	C	JAN MARIE CREGO	AMERICAN PETROLEUM PARTNERS LLC	1/8+	939 601	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*29085	3-19-78	C	LUJEAN EGAN	TH EXPLORATION LLC	1/8+	1084 192	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*30579	3-19-78	C	GREENFIELD RESOURCES LLC	TH EXPLORATION LLC	1/8+	1105 272	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*38500	3-19-78	C	NINA FLETCHER AND RICHARD FLETCHER	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779 525	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38501	3-19-78	C	DOUGLAS BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779 526	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38502	3-19-78	C	THOMAS BRIGGS AND BRENDA M BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779 527	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38504	3-19-78	C	REGINA D FIGUEROA	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779 529	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38505	3-19-78	C	DANNY S KERNS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779 530	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120

10*38506	3-19-78	C	ROGER BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	540	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38527	3-19-78	C	DEENA J PALOMO	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	531	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38529	3-19-78	C	GERRI A BANNISTER	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	532	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38530	3-19-78	C	JULIE BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	533	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38531	3-19-78	C	JOHN BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	534	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38532	3-19-78	C	JEFF BRIGGS AND CONNIE BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	537	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38533	3-19-78	C	GARY BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	538	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38534	3-19-78	C	JERRILYN LITTS AND IVAN LITTS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	539	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*25525	3-19-77	D	JAN MARIE CREGO	AMERICAN PETROLEUM PARTNERS LLC	1/8+	939	601	N/A	N/A	N/A	N/A	N/A	N/A	N/A	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/503
10*29085	3-19-77	D	LUJEAN EGAN	TH EXPLORATION LLC	1/8+	1084	192	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*30579	3-19-77	D	GREENFIELD RESOURCES LLC	TH EXPLORATION LLC	1/8+	1105	272	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

10*38500	3-19-77	D	NINA FLETCHER AND RICHARD FLETCHER	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	525	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38501	3-19-77	D	DOUGLAS BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	526	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38502	3-19-77	D	THOMAS BRIGGS AND BRENDA M BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	527	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38504	3-19-77	D	REGINA D FIGUEROA	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	529	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38505	3-19-77	D	DANNY S KERNS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	530	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38506	3-19-77	D	ROGER BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	540	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38527	3-19-77	D	DEENA J PALOMO	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	531	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38529	3-19-77	D	GERRI A BANNISTER	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	532	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120

10*38530	3-19-77	D	JULIE BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	533	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38531	3-19-77	D	JOHN BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	534	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38532	3-19-77	D	JEFF BRIGGS AND CONNIE BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	537	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38533	3-19-77	D	GARY BRIGGS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	538	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*38534	3-19-77	D	JERRILYN LITTS AND IVAN LITTS	AMERICAN SHALE DEVELOPMENT INC AND REPUBLIC ENERGY VENTURES LLC	1/8+	779	539	N/A	N/A	N/A	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to SWN Production Company LLC & Equinor USA Onshore Properties Inc: 44/489	Equinor USA Onshore Properties Inc to TH Exploration LLC: 49/104	SWN Production Company LLC to TH Exploration LLC: 49/120
10*23798	7-1-7	E	WILLIAM E PARSONS AND NANCY L PARSONS	TH EXPLORATION LLC	1/8+	1011	489	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17925	3-18-3	F	BOUNTY MINERALS LLC	TH EXPLORATION LLC	1/8+	928	393	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*31251	3-18-3	F	GOSHORN RIDGE LLC	TRANS ENERGY INC AND REPUBLIC PARTNERS VI LP	1/8+	723	192	N/A	N/A	Trans Energy Inc to Republic Energy Ventures LLC: 24/425	Trans Energy Inc to American Shale Development Inc: 27/172	Republic Energy Ventures LLC to Republic Partners VIII, LLC: 27/638 & 28/184	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to TH Exploration LLC: 48/21
10*31251	3-18-3.1	G	GOSHORN RIDGE LLC	TRANS ENERGY INC AND REPUBLIC PARTNERS VI LP	1/8+	723	192	N/A	N/A	Trans Energy Inc to Republic Energy Ventures LLC: 24/425	Trans Energy Inc to American Shale Development Inc: 27/172	Republic Energy Ventures LLC to Republic Partners VIII, LLC: 27/638 & 28/184	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to TH Exploration LLC: 48/21
10*17925	7-1-11	H	BOUNTY MINERALS LLC	TH EXPLORATION LLC	1/8+	928	393	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*31251	7-1-11	H	GOSHORN RIDGE LLC	TRANS ENERGY INC AND REPUBLIC PARTNERS VI LP	1/8+	723	192	N/A	N/A	Trans Energy Inc to Republic Energy Ventures LLC: 24/425	Trans Energy Inc to American Shale Development Inc: 27/172	Republic Energy Ventures LLC to Republic Partners VIII, LLC: 27/638 & 28/184	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to TH Exploration LLC: 48/21
10*17925	7-1-15	I	BOUNTY MINERALS LLC	TH EXPLORATION LLC	1/8+	928	393	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

10*31251	7-1-15	I	GOSHORN RIDGE LLC	TRANS ENERGY INC AND REPUBLIC PARTNERS VI LP	1/8+	723	192	N/A	N/A	Trans Energy Inc to Republic Energy Ventures LLC: 24/425	Trans Energy Inc to American Shale Development Inc: 27/172	Republic Energy Ventures LLC to Republic Partners VIII, LLC: 27/638 & 28/184	American Shale Development Inc to Republic Partners VIII LLC: 31/482	Republic Energy Ventures LLC, Republic Partners VI, LP, Republic Partners VII, LLC, Republic Partners VIII, LLC, and Republic Energy Operating LLC to EQT Production Company: 37/25	EQT Production Company to TH Exploration LLC: 48/21
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ASSIGNMENT AND BILL OF SALE

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

RECITALS

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

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

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

ARTICLE I
DEFINED TERMS

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

ARTICLE II
ASSIGNMENT OF ASSETS

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

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

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

RECEIVED
Office of Oil and Gas
DEC 06 2021
WV Department of
Environmental Protection

12/31/2021

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 October 18, 2021 (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 15, 2021 (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.

**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.

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 June 30, 2021 (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 22, 2021 (the "*Acreage Trade Agreement*").

**ARTICLE 1
ASSIGNMENT OF ASSETS**

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

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

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Section 2.2 Disclaimers of Warranties and Representations.

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

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

Date of Notice: 11/3/2021 Date Permit Application Filed: 11/3/2021

Notice of:

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

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s) ✓
 Name: CNX Land, LLC (Well Pad and Access Road)
 Address: 1000 Consol Energy Drive
 Canonsburg, PA 15317

Name: _____
 Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)

Name: _____
 Address: _____

Name: _____
 Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
 Address: _____

COAL OWNER OR LESSEE
 Name: _____
 Address: _____

COAL OPERATOR
 Name: _____
 Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
 Name: _____
 Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
 Name: _____
 Address: _____

*Please attach additional forms if necessary

RECEIVED
 Office of Oil and Gas
 DEC 06 2021
 WV Department of
 Environmental Protection

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

12/31/2021

examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

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Office of Oil and Gas
DEC 06 2021
WV Department of
Environmental Protection

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

12/31/2021

Time Limits and Methods for Filing Comments.

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

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

Comment Requirements

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

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

Permit Denial or Condition

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

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

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

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

WW-6A
(8-13)

API NO. 47-051 -
OPERATOR WELL NO. Breckenridge S-10HM
Well Pad Name: Breckenridge

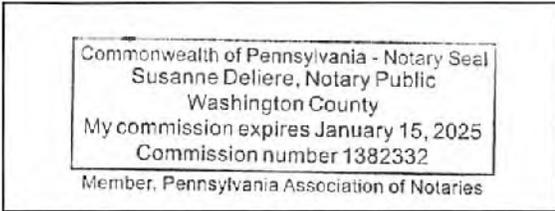
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8386
Email: amorris@tug-hilltop.com *amorris*

Address: 360 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

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



Subscribed and sworn before me this 3rd day of November, 2021
Susanne Deliere Notary Public
My Commission Expires 1/15/2025

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WV Department of
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OFFICIAL USE

Certified Mail Fee	
\$	
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$ _____
<input type="checkbox"/> Return Receipt (electronic)	\$ _____
<input type="checkbox"/> Certified Mail Restricted Delivery	\$ _____
<input type="checkbox"/> Adult Signature Required	\$ _____
<input type="checkbox"/> Adult Signature Restricted Delivery	\$ _____
Postage	
\$	
Total	
\$	



CNX Land Resources, LLC
 Attn: Casey Saunders
 1000 Consol Energy Drive
 Canonsburg, PA 15317

✓

PS Form 3800, April 2017 Edition See Reverse for Instructions

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Office of Oil and Gas
DEC 06 2021
WV Department of
Environmental Protection

12/31/2021



December 2, 2021

WVDEP Office of Oil & Gas
Attn: Charles T. Brewer
601 57th Street, SE
Charleston, WV 25304-2345

Subject: **Permit Modification Request** for Breckenridge S-8^{HM} (47-051-02346) located in Cameron District; Marshall County, WV
**Changes to Permit: Bottom Hole Revision (drilling further)
Freshwater string change**

Dear Taylor:

Enclosed please find the following:

- Modification fee in the amount of \$2,500
- Revised WW-6B
- Revised Well Site Safety Plan
- Revised Mylar Well Plat
- Updated WW-6A1 Information
- Updated Area of Review for Communication
- WW-6A to surface owner for revised freshwater casing string

RECEIVED
Office of Oil and Gas

DEC 06 2021

WV Department of
Environmental Protection

If you have any question or need any additional information, please feel free to call me at 304-376-0111.
Thank you for your consideration in this matter.

Sincerely,

Amy L. Morris
Permitting Specialist – Appalachia Region

CK#-053341
Amt \$2500
Date 11/11/21



Stansberry, Wade A <wade.a.stansberry@wv.gov>

Modification Horizontal H6A Well Work Permit (API: 47-051-02346)

1 message

Stansberry, Wade A <wade.a.stansberry@wv.gov>

Tue, Dec 28, 2021 at 9:23 AM

To: Amy Morris <amorris@tug-hilop.com>, "Knitowski, Gayne J" <e026012@wv.gov>, Scott Lemley <slemley@wvassessor.com>

I have attached a copy of the newly issued well [permit](#) numbers:

47-051-02346 - BRECKENRIDGE S-10HM

This will serve as your copy.

If you have any questions, then [please](#) contact us here at the Office of Oil and Gas.

Thank you,

Wade A. Stansberry**Environmental Resource Specialist 3****West Virginia Department of Environmental Protection****Office of Oil & Gas****601 57th St. SE****Charleston, WV 25304****(304) 926-0499 ext. 41115****(304) 926-0452 fax****Wade.A.Stansberry@wv.gov**

2 attachments **47-051-02346 - mod.pdf**
3657K **IR-26 Blank.pdf**
152K**12/31/2021**



Stansberry, Wade A <wade.a.stansberry@wv.gov>

Re: Modification Horizontal H6A Well Work Permit (API: 47-051-02346)

1 message

Stansberry, Wade A <wade.a.stansberry@wv.gov>

Tue, Dec 28, 2021 at 9:24 AM

To: Amy Morris <amorris@tug-hillop.com>, "Knitowski, Gayne J" <e026012@wv.gov>

SSP attached

Thank you,

Wade A. Stansberry**Environmental Resource Specialist 3****West Virginia Department of Environmental Protection****Office of Oil & Gas****601 57th St. SE****Charleston, WV 25304****(304) 926-0499 ext. 41115****(304) 926-0452 fax****Wade.A.Stansberry@wv.gov**

On Tue, Dec 28, 2021 at 9:23 AM Stansberry, Wade A <wade.a.stansberry@wv.gov> wrote:

I have attached a copy of the newly issued well [permit](#) numbers:**47-051-02346 - BRECKENRIDGE S-10HM**

This will serve as your copy.

If you have any questions, then [please](#) contact us here at the Office of Oil and Gas.

Thank you,

Wade A. Stansberry**Environmental Resource Specialist 3****West Virginia Department of Environmental Protection****Office of Oil & Gas****601 57th St. SE****Charleston, WV 25304****(304) 926-0499 ext. 41115****(304) 926-0452 fax****Wade.A.Stansberry@wv.gov**

 51-02346 SSP mod signed.pdf
62K**12/31/2021**