



Well: Breckenridge S-21 HU (slot U)
Site: Breckenridge (1 row)
Project: Marshall County, West Virginia NAD83 UTM 17N
Design: rev7
Rig: Nabors X14

SECTION DETAILS

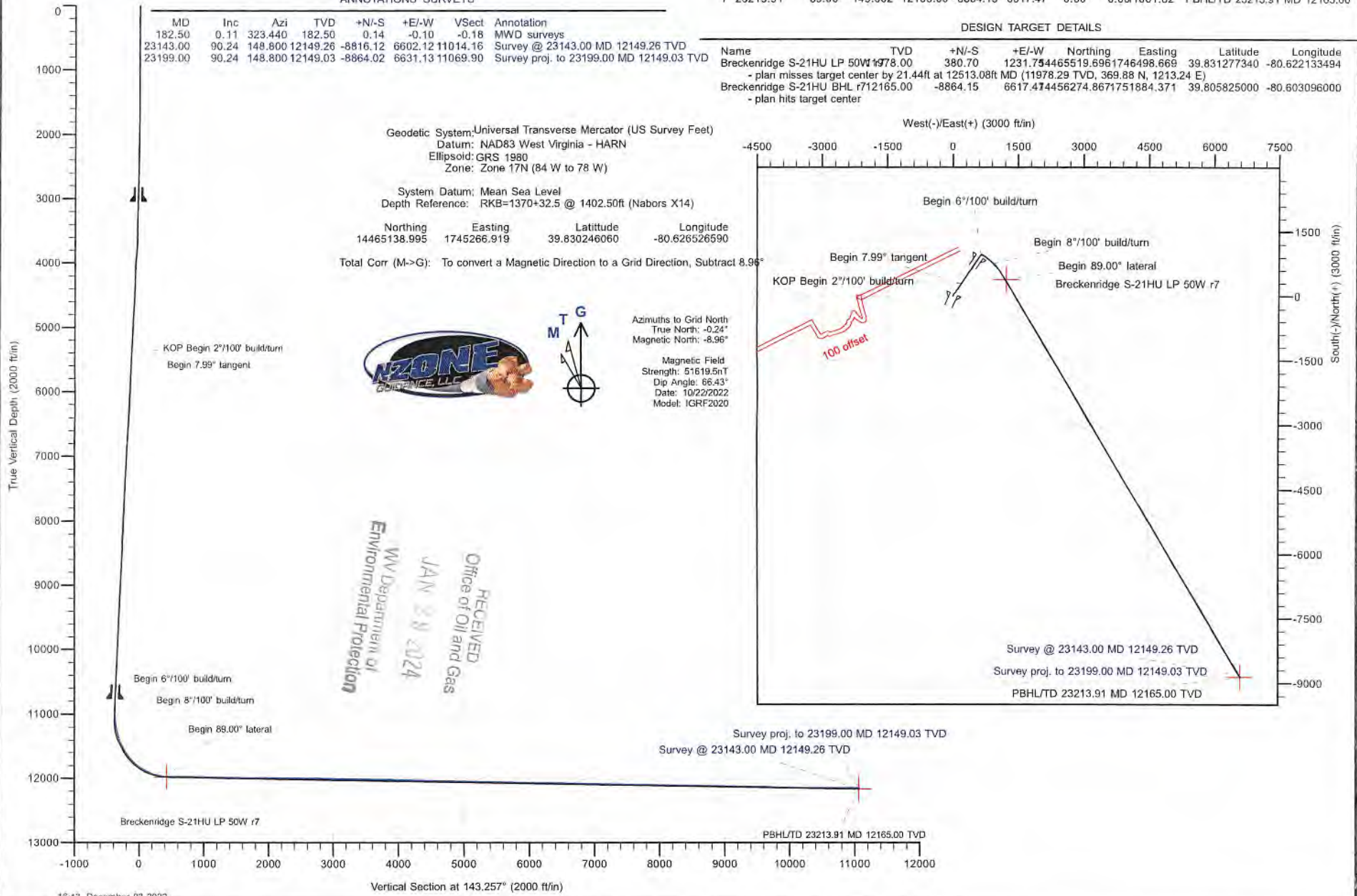
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	5291.50	7.96	34.400	5269.09	282.37	188.80	0.00	0.00	-113.33	Survey @ 5291.50 MD 5269.09 TVD
2	5391.50	7.96	34.400	5368.13	293.80	196.62	0.00	0.00	-117.80	KOP Begin 2°/100' build/turn
3	5397.58	7.99	33.557	5374.15	294.50	197.09	2.00	-74.73	-118.08	Begin 7.99° tangent
4	11118.34	7.99	33.557	11039.34	957.40	636.80	0.00	0.00	-386.24	Begin 6°/100' build/turn
5	11985.31	50.00	135.000	11800.25	759.00	925.00	6.00	107.72	-54.85	Begin 8°/100' build/turn
6	12500.55	89.00	149.662	11978.07	380.70	1206.91	8.00	22.59	416.94	Begin 89.00° lateral
7	23213.91	89.00	149.662	12165.00	-8864.15	6617.47	0.00	0.00	1061.82	PBHLTD 23213.91 MD 12165.00 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Annotation
182.50	0.11	323.440	182.50	0.14	-0.10	-0.18	MWD surveys
23143.00	90.24	148.800	12149.26	-8816.12	6602.12	11014.16	Survey @ 23143.00 MD 12149.26 TVD
23199.00	90.24	148.800	12149.03	-8864.02	6631.13	11069.90	Survey proj. to 23199.00 MD 12149.03 TVD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Breckenridge S-21HU LP 50W r7	11978.00	380.70	1231.75	4465519.696	1746498.669	39.831277340	-80.622133494
- plan misses target center by 21.44ft at 12513.08ft MD (11978.29 TVD, 369.88 N, 1213.24 E)							
Breckenridge S-21HU BHL r7	12165.00	-8864.15	6617.47	4456274.867	1751884.371	39.805825000	-80.603096000
- plan hits target center							





Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Project	Marshall County, West Virginia NAD83 UTM 17N		
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:	14,465,184.757 usft	Latitude:	39.830374010
From:	Lat/Long	Easting:	1,745,068.182 usft	Longitude:	-80.627233790
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "		

Well	Breckenridge S-21 HU (slot U)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,138.995 usft	Latitude:	39.830246060
	+E/-W	0.00 ft	Easting:	1,745,266.919 usft	Longitude:	-80.626526590
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	1,370.00 ft
Grid Convergence:	0.24 °					

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	10/22/2022	-8.72	66.43	51,619.54046176

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	143.257	

Survey Program	Date	12/3/2022			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
182.50	1,185.50	MWD surf (Original Hole)	MWD	MWD - Standard	
1,212.50	3,016.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,076.50	4,376.50	MWD 2996-4356 MD (Original Hole)	MWD	MWD - Standard	
4,407.50	5,291.50	MWD 4407.5 - 5291.5 MD (Original Hole)	MWD	MWD - Standard	
5,343.00	9,731.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
9,823.00	23,143.00	MWD (Original Hole)	MWD	MWD - Standard	
23,199.00	23,199.00	Projection (Original Hole)	MWD	MWD - Standard	

Survey											
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)		
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
182.50	0.11	323.440	182.50	0.14	-0.10	-0.18	0.06	0.06	0.06	0.00	0.00
MWD surveys											
210.50	0.20	67.670	210.50	0.18	-0.08	-0.19	0.90	0.32	372.25		
240.50	0.11	71.240	240.50	0.21	0.00	-0.17	0.30	-0.30	11.90		



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
267.50	0.15	52.820	267.50	0.24	0.05	-0.16	0.21	0.15	-68.22
297.50	0.10	353.800	297.50	0.29	0.08	-0.18	0.44	-0.17	-196.73
326.50	0.11	333.810	326.50	0.34	0.07	-0.23	0.13	0.03	-68.93
358.50	0.09	308.410	358.50	0.38	0.03	-0.29	0.15	-0.06	-79.38
389.50	0.15	291.750	389.50	0.41	-0.02	-0.34	0.22	0.19	-53.74
421.50	0.22	314.050	421.50	0.47	-0.11	-0.44	0.31	0.22	69.69
452.50	0.11	305.420	452.50	0.53	-0.17	-0.53	0.36	-0.35	-27.84
484.50	0.19	341.740	484.50	0.60	-0.22	-0.61	0.38	0.25	113.50
515.50	0.19	334.560	515.50	0.69	-0.25	-0.71	0.08	0.00	-23.16
547.50	0.11	326.550	547.50	0.77	-0.29	-0.79	0.26	-0.25	-25.03
579.50	0.27	317.550	579.50	0.85	-0.36	-0.90	0.51	0.50	-28.13
611.50	0.28	325.910	611.50	0.97	-0.46	-1.05	0.13	0.03	26.13
642.50	0.36	296.560	642.50	1.07	-0.59	-1.21	0.58	0.26	-94.68
674.50	0.29	322.600	674.50	1.18	-0.72	-1.38	0.50	-0.22	81.38
706.50	0.27	312.690	706.50	1.30	-0.83	-1.54	0.16	-0.06	-30.97
738.50	0.29	290.140	738.50	1.38	-0.96	-1.68	0.35	0.06	-70.47
769.50	0.40	311.040	769.50	1.48	-1.12	-1.85	0.53	0.35	67.42
801.50	0.42	320.010	801.50	1.64	-1.28	-2.08	0.21	0.06	28.03
832.50	0.40	317.420	832.49	1.81	-1.42	-2.30	0.09	-0.06	-8.35
864.50	0.44	301.130	864.49	1.95	-1.60	-2.52	0.39	0.13	-50.91
895.50	0.48	302.210	895.49	2.08	-1.81	-2.75	0.13	0.13	3.48
927.50	0.40	314.630	927.49	2.23	-2.01	-2.99	0.39	-0.25	38.81
959.50	0.50	317.570	959.49	2.41	-2.18	-3.24	0.32	0.31	9.19
990.50	0.40	322.540	990.49	2.60	-2.34	-3.48	0.35	-0.32	16.03
1,022.50	0.40	316.120	1,022.49	2.77	-2.48	-3.70	0.14	0.00	-20.06
1,053.50	0.53	325.750	1,053.49	2.97	-2.64	-3.96	0.49	0.42	31.06
1,085.50	0.52	321.070	1,085.49	3.20	-2.81	-4.25	0.14	-0.03	-14.63
1,117.50	0.43	314.980	1,117.49	3.40	-2.99	-4.51	0.32	-0.28	-19.03
1,148.50	0.49	318.630	1,148.48	3.58	-3.16	-4.76	0.22	0.19	11.77
1,185.50	0.50	315.330	1,185.48	3.81	-3.38	-5.08	0.08	0.03	-8.32
1,212.50	0.32	295.050	1,212.48	3.93	-3.53	-5.26	0.85	-0.67	-75.11
1,244.50	0.25	335.110	1,244.48	4.03	-3.64	-5.41	0.64	-0.22	125.19
1,274.50	0.28	321.200	1,274.48	4.15	-3.71	-5.54	0.24	0.10	-46.37
1,306.50	0.19	9.280	1,306.48	4.26	-3.75	-5.66	0.65	-0.28	50.25
1,338.50	0.27	341.820	1,338.48	4.38	-3.77	-5.77	0.42	0.25	-85.81
1,369.50	0.30	16.860	1,369.48	4.53	-3.77	-5.89	0.56	0.10	113.03
1,401.50	0.38	44.100	1,401.48	4.69	-3.67	-5.95	0.56	0.25	85.13
1,433.50	0.39	45.920	1,433.48	4.84	-3.52	-5.98	0.05	0.03	5.69
1,464.50	0.54	63.520	1,464.48	4.98	-3.31	-5.97	0.66	0.48	56.77
1,496.50	0.61	56.740	1,496.48	5.14	-3.03	-5.93	0.30	0.22	-21.19
1,528.50	0.62	72.500	1,528.48	5.28	-2.73	-5.87	0.53	0.03	49.25
1,559.50	0.52	69.760	1,559.47	5.38	-2.43	-5.77	0.33	-0.32	-8.84
1,591.50	0.45	53.820	1,591.47	5.51	-2.20	-5.73	0.47	-0.22	-49.81

RECEIVED
Office of Oil and Gas
JAN 29 2024
WV Department of Environmental Protection



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,621.50	0.50	47.520	1,621.47	5.67	-2.00	-5.74	0.24	0.17	-21.00
1,653.50	0.44	46.780	1,653.47	5.84	-1.81	-5.77	0.19	-0.19	-2.31
1,685.50	0.44	37.580	1,685.47	6.03	-1.65	-5.81	0.22	0.00	-28.75
1,728.50	0.55	58.720	1,728.47	6.26	-1.37	-5.84	0.49	0.26	49.16
1,750.50	0.46	83.280	1,750.47	6.33	-1.19	-5.79	1.06	-0.41	111.64
1,781.50	0.28	98.420	1,781.47	6.33	-0.99	-5.67	0.66	-0.58	48.84
1,813.50	0.36	91.470	1,813.47	6.32	-0.82	-5.55	0.28	0.25	-21.72
1,845.50	0.15	52.990	1,845.47	6.34	-0.68	-5.49	0.81	-0.66	-120.25
1,877.50	0.36	94.210	1,877.47	6.36	-0.55	-5.42	0.83	0.66	128.81
1,907.50	0.38	59.770	1,907.46	6.40	-0.37	-5.35	0.73	0.07	-114.80
1,939.50	0.42	81.970	1,939.46	6.47	-0.16	-5.28	0.50	0.13	69.38
1,971.50	0.40	58.580	1,971.46	6.55	0.05	-5.22	0.52	-0.06	-73.09
2,002.50	0.19	35.390	2,002.46	6.65	0.17	-5.22	0.77	-0.68	-74.81
2,034.50	0.39	70.780	2,034.46	6.72	0.31	-5.20	0.81	0.63	110.59
2,066.50	0.58	30.670	2,066.46	6.90	0.49	-5.23	1.18	0.59	-125.34
2,098.50	0.95	27.450	2,098.46	7.27	0.70	-5.41	1.16	1.16	-10.06
2,130.50	1.75	27.830	2,130.45	7.94	1.05	-5.74	2.50	2.50	1.19
2,161.50	2.68	33.590	2,161.43	8.96	1.67	-6.18	3.08	3.00	18.58
2,193.50	3.38	28.730	2,193.38	10.41	2.54	-6.83	2.33	2.19	-15.19
2,224.50	3.94	29.810	2,224.32	12.14	3.51	-7.63	1.82	1.81	3.48
2,256.50	4.20	28.210	2,256.24	14.13	4.61	-8.56	0.89	0.81	-5.00
2,287.50	4.32	27.120	2,287.15	16.17	5.68	-9.56	0.47	0.39	-3.52
2,319.50	4.27	29.360	2,319.06	18.28	6.81	-10.57	0.55	-0.16	7.00
2,351.50	4.28	34.590	2,350.97	20.30	8.07	-11.44	1.22	0.03	16.34
2,382.50	4.04	34.350	2,381.89	22.15	9.34	-12.16	0.78	-0.77	-0.77
2,413.50	3.15	29.830	2,412.83	23.79	10.38	-12.85	3.01	-2.87	-14.58
2,444.50	2.37	27.160	2,443.79	25.10	11.10	-13.47	2.55	-2.52	-8.61
2,476.50	2.05	34.400	2,475.77	26.16	11.72	-13.95	1.33	-1.00	22.63
2,508.50	2.06	27.570	2,507.75	27.15	12.31	-14.39	0.77	0.03	-21.34
2,539.50	1.96	30.450	2,538.73	28.10	12.84	-14.83	0.46	-0.32	9.29
2,571.50	2.35	30.030	2,570.71	29.14	13.45	-15.30	1.22	1.22	-1.31
2,603.50	2.48	24.430	2,602.68	30.33	14.06	-15.90	0.84	0.41	-17.50
2,635.50	2.67	22.940	2,634.65	31.65	14.64	-16.61	0.63	0.59	-4.66
2,666.50	2.75	27.420	2,665.61	32.98	15.26	-17.29	0.73	0.26	14.45
2,698.50	2.81	27.310	2,697.57	34.35	15.98	-17.97	0.19	0.19	-0.34
2,730.50	2.75	24.450	2,729.54	35.75	16.65	-18.69	0.47	-0.19	-8.94
2,761.50	2.56	25.140	2,760.50	37.05	17.26	-19.37	0.62	-0.61	2.23
2,793.50	2.36	27.370	2,792.47	38.29	17.86	-19.99	0.69	-0.63	6.97
2,824.50	2.30	34.780	2,823.45	39.36	18.51	-20.47	0.99	-0.19	23.90
2,856.50	2.01	42.600	2,855.43	40.30	19.26	-20.78	1.29	-0.91	24.44
2,888.50	1.86	42.270	2,887.41	41.10	19.99	-20.98	0.47	-0.47	-1.03
2,919.50	1.86	40.190	2,918.39	41.86	20.65	-21.19	0.22	0.00	-6.71
2,950.50	1.87	39.350	2,949.37	42.63	21.29	-21.42	0.09	0.03	-2.71



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,981.50	1.71	33.140	2,980.36	43.41	21.87	-21.71	0.81	-0.52	-20.03
3,016.50	1.49	25.960	3,015.35	44.26	22.35	-22.09	0.85	-0.63	-20.51
3,076.50	1.61	18.260	3,075.32	45.76	22.96	-22.94	0.40	0.20	-12.83
3,107.50	1.90	21.420	3,106.31	46.65	23.28	-23.46	0.99	0.94	10.19
3,138.50	2.25	19.610	3,137.29	47.70	23.67	-24.06	1.15	1.13	-5.84
3,170.50	2.91	22.060	3,169.26	49.05	24.19	-24.83	2.09	2.06	7.66
3,202.50	3.58	23.780	3,201.20	50.72	24.90	-25.75	2.12	2.09	5.38
3,234.50	4.48	25.280	3,233.13	52.76	25.83	-26.82	2.83	2.81	4.69
3,266.50	5.60	26.850	3,265.00	55.28	27.07	-28.10	3.53	3.50	4.91
3,298.50	6.63	28.690	3,296.82	58.30	28.66	-29.57	3.28	3.22	5.75
3,330.50	7.52	33.520	3,328.57	61.66	30.71	-31.04	3.34	2.78	15.09
3,361.50	8.30	40.140	3,359.28	65.06	33.27	-32.23	3.86	2.52	21.35
3,393.50	8.72	42.870	3,390.93	68.61	36.41	-33.20	1.82	1.31	8.53
3,425.50	8.88	44.400	3,422.55	72.15	39.79	-34.01	0.89	0.50	4.78
3,456.50	8.91	48.040	3,453.18	75.47	43.25	-34.60	1.82	0.10	11.74
3,488.50	8.42	53.670	3,484.81	78.51	46.98	-34.81	3.06	-1.53	17.59
3,519.50	8.15	58.570	3,515.49	81.00	50.68	-34.59	2.44	-0.87	15.81
3,552.50	7.43	63.340	3,548.19	83.18	54.58	-34.00	2.93	-2.18	14.45
3,583.50	6.67	64.230	3,578.95	84.86	58.00	-33.31	2.48	-2.45	2.87
3,615.50	5.10	59.170	3,610.78	86.40	60.89	-32.80	5.16	-4.91	-15.81
3,646.50	4.09	48.550	3,641.68	87.83	62.90	-32.75	4.25	-3.26	-34.26
3,678.50	3.52	36.330	3,673.61	89.38	64.34	-33.13	3.09	-1.78	-38.19
3,710.50	3.65	24.490	3,705.55	91.10	65.35	-33.91	2.34	0.41	-37.00
3,741.50	4.71	12.880	3,736.47	93.24	66.04	-35.21	4.36	3.42	-37.45
3,773.50	5.94	8.130	3,768.33	96.16	66.57	-37.23	4.08	3.84	-14.84
3,804.50	7.10	7.720	3,799.13	99.65	67.05	-39.74	3.74	3.74	-1.32
3,836.50	8.11	9.000	3,830.85	103.83	67.67	-42.72	3.20	3.16	4.00
3,868.50	9.25	11.890	3,862.48	108.58	68.55	-46.00	3.81	3.56	9.03
3,900.50	10.51	14.630	3,894.01	113.92	69.82	-49.52	4.20	3.94	8.56
3,932.50	11.41	19.540	3,925.42	119.73	71.61	-53.10	4.05	2.81	15.34
3,963.50	11.69	26.180	3,955.80	125.44	74.03	-56.23	4.38	0.90	21.42
3,995.50	11.21	33.530	3,987.16	130.94	77.17	-58.76	4.80	-1.50	22.97
4,026.50	10.75	40.920	4,017.59	135.64	80.73	-60.39	4.77	-1.48	23.84
4,058.50	10.13	46.330	4,049.06	139.83	84.72	-61.37	3.62	-1.94	16.91
4,089.50	9.40	49.140	4,079.62	143.37	88.61	-61.88	2.81	-2.35	19.06
4,121.50	7.94	50.990	4,111.25	146.47	92.30	-62.16	4.64	-4.56	5.78
4,152.50	7.49	50.720	4,141.97	149.10	95.53	-62.33	1.46	-1.45	-0.87
4,185.50	7.16	49.410	4,174.70	151.80	98.76	-62.56	1.12	-1.00	-3.97
4,217.50	6.94	48.370	4,206.46	154.38	101.72	-62.86	0.79	-0.69	-3.25
4,248.50	6.87	46.280	4,237.23	156.91	104.46	-63.25	0.84	-0.23	-6.74
4,280.50	6.85	44.400	4,269.00	159.59	107.18	-63.77	0.70	-0.06	-5.88
4,312.50	7.31	42.200	4,300.76	162.47	109.88	-64.46	1.67	1.44	-6.88
4,344.50	7.73	39.480	4,332.48	165.64	112.61	-65.36	1.72	1.31	-8.50
4,376.50	7.94	36.950	4,364.19	169.06	115.31	-66.49	1.26	0.66	-7.91

RECEIVED
 2/14/24
 Department of Oil and Gas
 2/29/24
 Department of Environmental Protection



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,407.50	8.11	31.030	4,394.88	172.65	117.73	-67.92	2.72	0.55	-19.10
4,439.50	8.13	33.300	4,426.56	176.47	120.13	-69.55	1.00	0.06	7.09
4,470.50	8.25	31.690	4,457.25	180.20	122.50	-71.11	0.83	0.39	-5.19
4,501.50	8.51	29.810	4,487.91	184.08	124.81	-72.84	1.22	0.84	-6.06
4,533.50	8.38	30.210	4,519.57	188.15	127.16	-74.70	0.45	-0.41	1.25
4,565.50	7.86	32.520	4,551.25	192.01	129.51	-76.39	1.92	-1.63	7.22
4,596.50	7.61	33.230	4,581.96	195.51	131.78	-77.84	0.86	-0.81	2.29
4,627.50	7.65	32.430	4,612.69	198.97	134.01	-79.28	0.37	0.13	-2.58
4,659.50	7.82	31.960	4,644.40	202.62	136.30	-80.82	0.57	0.53	-1.47
4,690.50	8.00	30.140	4,675.10	206.27	138.50	-82.44	0.99	0.58	-5.87
4,722.50	8.37	29.700	4,706.78	210.22	140.77	-84.24	1.17	1.16	-1.38
4,753.50	8.68	28.350	4,737.44	214.24	143.00	-86.13	1.19	1.00	-4.35
4,785.50	9.11	28.500	4,769.05	218.59	145.36	-88.21	1.35	1.34	0.47
4,817.50	9.43	29.870	4,800.63	223.09	147.87	-90.31	1.21	1.00	4.28
4,849.50	9.78	30.940	4,832.18	227.70	150.57	-92.38	1.23	1.09	3.34
4,880.50	9.84	33.050	4,862.73	232.17	153.37	-94.30	1.18	0.19	6.81
4,912.50	8.78	36.120	4,894.31	236.44	156.30	-95.96	3.66	-3.31	9.59
4,943.50	8.26	38.900	4,924.97	240.08	159.10	-97.21	2.14	-1.68	8.97
4,975.50	8.10	39.390	4,956.64	243.61	161.97	-98.32	0.55	-0.50	1.53
5,006.50	7.98	39.040	4,987.34	246.97	164.71	-99.37	0.42	-0.39	-1.13
5,038.50	8.19	37.480	5,019.02	250.51	167.50	-100.54	0.95	0.66	-4.88
5,070.50	8.45	36.330	5,050.68	254.21	170.28	-101.84	0.96	0.81	-3.59
5,101.50	8.60	34.550	5,081.34	257.95	172.94	-103.25	0.98	0.48	-5.74
5,133.50	8.97	33.780	5,112.96	262.00	175.69	-104.85	1.21	1.16	-2.41
5,164.50	9.17	32.190	5,143.58	266.10	178.35	-106.54	1.03	0.65	-5.13
5,196.50	9.27	31.770	5,175.16	270.45	181.06	-108.40	0.38	0.31	-1.31
5,227.50	8.72	32.560	5,205.78	274.55	183.64	-110.15	1.82	-1.77	2.55
5,259.50	8.50	33.370	5,237.42	278.57	186.25	-111.81	0.79	-0.69	2.53
5,291.50	7.96	34.400	5,269.09	282.37	188.80	-113.33	1.75	-1.69	3.22
5,343.00	8.11	34.960	5,320.09	288.29	192.90	-115.62	0.33	0.29	1.09
5,437.00	8.98	33.150	5,413.04	299.87	200.71	-120.22	0.97	0.93	-1.93
5,530.00	10.15	30.870	5,504.75	312.98	208.88	-125.84	1.32	1.26	-2.45
5,623.00	10.27	31.140	5,596.27	327.11	217.37	-132.08	0.14	0.13	0.29
5,717.00	8.84	33.770	5,688.97	340.29	225.72	-137.65	1.59	-1.52	2.80
5,811.00	7.24	33.060	5,782.04	351.26	232.97	-142.10	1.71	-1.70	-0.76
5,904.00	7.20	31.870	5,874.30	361.12	239.24	-146.25	0.17	-0.04	-1.28
5,998.00	8.94	29.800	5,967.37	372.46	245.98	-151.31	1.88	1.85	-2.20
6,091.00	8.65	31.020	6,059.28	384.72	253.18	-156.83	0.37	-0.31	1.31
6,184.00	7.65	36.870	6,151.34	395.67	260.50	-161.22	1.40	-1.08	6.29
6,278.00	6.69	40.590	6,244.60	404.83	267.81	-164.19	1.13	-1.02	3.96
6,371.00	7.08	42.020	6,336.93	413.20	275.17	-166.49	0.46	0.42	1.54
6,464.00	7.32	35.270	6,429.20	422.30	282.43	-169.44	0.94	0.26	-7.26
6,558.00	6.88	33.690	6,522.48	431.87	289.01	-173.18	0.51	-0.47	-1.68



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,650.00	7.20	34.220	6,613.79	441.22	295.31	-176.90	0.35	0.35	0.58
6,744.00	8.74	34.780	6,706.87	451.96	302.70	-181.09	1.64	1.64	0.60
6,837.00	8.36	34.250	6,798.84	463.35	310.53	-185.53	0.42	-0.41	-0.57
6,930.00	7.18	32.250	6,890.99	473.86	317.44	-189.81	1.30	-1.27	-2.15
7,023.00	6.85	30.230	6,983.29	483.56	323.33	-194.07	0.44	-0.35	-2.17
7,118.00	7.29	30.390	7,077.57	493.66	329.24	-198.62	0.46	0.46	0.17
7,210.00	8.22	29.350	7,168.72	504.43	335.41	-203.56	1.02	1.01	-1.13
7,304.00	9.16	27.940	7,261.64	516.89	342.21	-209.48	1.03	1.00	-1.50
7,398.00	8.52	27.680	7,354.53	529.67	348.95	-215.69	0.68	-0.68	-0.28
7,490.00	7.80	31.170	7,445.60	541.05	355.35	-220.98	0.95	-0.78	3.79
7,583.00	7.90	32.440	7,537.72	551.84	362.04	-225.62	0.22	0.11	1.37
7,677.00	8.25	30.790	7,630.79	563.09	368.96	-230.49	0.45	0.37	-1.76
7,771.00	7.63	31.510	7,723.89	574.20	375.68	-235.38	0.67	-0.66	0.77
7,864.00	7.04	34.660	7,816.13	584.15	382.14	-239.49	0.77	-0.63	3.39
7,957.00	7.25	36.990	7,908.41	593.53	388.92	-242.95	0.38	0.23	2.51
8,143.00	9.39	36.690	8,092.44	615.07	405.04	-250.56	1.15	1.15	-0.16
8,237.00	9.70	34.130	8,185.14	627.77	414.07	-255.35	0.56	0.33	-2.72
8,330.00	9.09	35.000	8,276.89	640.28	422.68	-260.21	0.67	-0.66	0.94
8,424.00	7.66	36.950	8,369.89	651.37	430.70	-264.30	1.55	-1.52	2.07
8,517.00	8.02	37.190	8,462.02	661.49	438.35	-267.84	0.39	0.39	0.26
8,704.00	7.26	38.060	8,647.36	681.19	453.52	-274.54	0.41	-0.41	0.47
8,798.00	7.99	35.940	8,740.52	691.15	461.02	-278.05	0.83	0.78	-2.26
8,892.00	8.37	31.440	8,833.57	702.28	468.42	-282.53	0.79	0.40	-4.79
8,985.00	8.85	29.600	8,925.52	714.27	475.49	-287.92	0.60	0.52	-1.98
9,079.00	8.91	34.320	9,018.39	726.57	483.16	-293.18	0.78	0.06	5.02
9,172.00	8.98	31.440	9,110.26	738.71	491.01	-298.22	0.49	0.08	-3.10
9,266.00	9.35	30.160	9,203.06	751.58	498.67	-303.94	0.45	0.39	-1.36
9,359.00	8.19	33.760	9,294.98	763.61	506.15	-309.11	1.38	-1.25	3.87
9,451.00	6.66	34.930	9,386.20	773.44	512.84	-312.98	1.67	-1.66	1.27
9,544.00	6.37	33.820	9,478.60	782.14	518.80	-316.39	0.34	-0.31	-1.19
9,638.00	7.37	32.790	9,571.92	791.55	524.97	-320.23	1.07	1.06	1.10
9,731.00	8.11	33.200	9,664.08	802.05	531.79	-324.57	0.80	0.80	0.44
9,823.00	9.20	34.100	9,755.03	813.57	539.47	-329.21	1.19	1.18	0.98
9,917.00	9.13	35.810	9,847.83	825.84	548.05	-333.91	0.30	-0.07	1.82
10,010.00	7.75	36.650	9,939.82	836.86	556.11	-337.92	1.49	1.48	0.99
10,104.00	8.18	37.210	10,032.91	847.27	563.93	-341.58	0.46	0.46	0.00
10,197.00	7.41	34.570	10,125.05	857.47	571.34	-345.33	0.91	-0.83	-2.84
10,290.00	7.16	31.690	10,217.30	867.34	577.79	-349.38	0.48	-0.27	-3.10
10,383.00	7.85	29.990	10,309.50	877.78	584.01	-354.02	0.78	0.74	-1.83
10,476.00	7.32	34.510	10,401.69	888.16	590.54	-358.43	0.86	-0.57	4.86
10,570.00	7.52	37.470	10,494.90	897.98	597.67	-362.03	0.46	0.21	3.15
10,663.00	8.41	36.060	10,587.01	908.30	605.38	-365.70	0.98	0.96	-1.52
10,815.00	7.03	35.860	10,737.62	924.83	617.37	-371.76	0.91	-0.91	-0.13

RECEIVED
Office of Oil and Gas
JAN 28 2024
West Virginia Department of Environmental Protection



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
10,909.00	6.63	44.270	10,830.96	933.38	624.53	-374.33	1.14	-0.43	8.95	
11,003.00	10.30	53.570	10,923.92	942.26	635.08	-375.13	4.15	3.90	9.89	
11,097.00	7.95	58.110	11,016.73	950.68	647.36	-374.54	2.61	-2.50	4.83	
11,144.00	8.53	70.850	11,063.25	953.54	653.42	-373.21	4.07	1.23	27.11	
11,191.00	9.06	87.720	11,109.70	954.83	660.41	-370.06	5.58	1.13	35.89	
11,238.00	9.46	104.820	11,156.10	953.99	667.84	-364.94	5.89	0.85	36.38	
11,285.00	10.52	117.030	11,202.39	951.05	675.40	-358.06	5.03	2.26	25.98	
11,332.00	12.64	124.520	11,248.43	946.19	683.46	-349.34	5.52	4.51	15.94	
11,379.00	15.20	126.240	11,294.05	939.63	692.67	-338.58	5.52	5.45	3.66	
11,426.00	17.10	125.270	11,339.19	932.00	703.28	-326.12	4.08	4.04	-2.06	
11,473.00	19.31	124.780	11,383.84	923.57	715.30	-312.17	4.71	4.70	-1.04	
11,520.00	21.96	124.390	11,427.82	914.18	728.94	-296.48	5.65	5.64	-0.83	
11,568.00	24.88	123.020	11,471.86	903.60	744.82	-278.51	6.19	6.08	-2.85	
11,615.00	27.84	123.640	11,513.97	892.13	762.25	-258.89	6.32	6.30	1.32	
11,660.00	30.67	124.610	11,553.23	879.79	780.45	-238.12	6.38	6.29	2.16	
11,707.00	33.05	126.500	11,593.14	865.36	800.62	-214.48	5.49	5.06	4.02	
11,753.00	35.84	127.210	11,631.07	849.75	821.43	-189.52	6.13	6.07	1.54	
11,800.00	39.20	129.850	11,668.35	831.90	843.80	-161.84	7.92	7.15	5.62	
11,846.00	42.47	128.400	11,703.15	812.94	867.14	-132.68	7.40	7.11	-3.15	
11,893.00	45.74	129.760	11,736.89	792.31	892.52	-100.97	7.24	6.96	2.89	
11,940.00	49.01	131.440	11,768.72	769.80	918.76	-67.23	7.44	6.96	3.57	
11,987.00	51.92	134.480	11,798.64	745.09	945.27	-31.58	7.95	6.19	6.47	
12,034.00	54.93	136.550	11,826.64	718.16	971.70	5.82	7.32	6.40	4.40	
12,081.00	58.11	138.890	11,852.57	689.15	998.06	44.83	7.94	6.77	4.98	
12,128.00	61.03	142.150	11,876.38	657.87	1,023.80	85.30	8.62	6.21	6.94	
12,175.00	64.52	144.260	11,897.88	624.40	1,048.82	127.08	8.43	7.43	4.49	
12,222.00	68.27	145.630	11,916.69	589.15	1,073.54	170.12	8.41	7.98	2.91	
12,269.00	71.68	147.390	11,932.79	552.33	1,097.90	214.20	8.06	7.26	3.74	
12,317.00	75.12	147.960	11,946.50	513.46	1,122.49	260.05	7.26	7.17	1.19	
12,364.00	78.44	149.290	11,957.24	474.40	1,146.30	305.60	7.58	7.06	2.83	
12,411.00	82.02	149.240	11,965.22	434.60	1,169.97	351.66	7.62	7.62	-0.11	
12,458.00	85.77	149.200	11,970.22	394.45	1,193.88	398.13	7.98	7.98	-0.09	
12,505.00	89.53	149.240	11,972.14	354.11	1,217.91	444.83	8.00	8.00	0.09	
12,599.00	89.48	151.450	11,972.96	272.43	1,264.42	538.10	2.35	-0.05	2.35	
12,693.00	89.00	148.270	11,974.20	191.16	1,311.60	631.45	3.42	-0.51	-3.38	
12,788.00	88.95	148.050	11,975.90	110.47	1,361.71	726.09	0.24	-0.05	-0.23	
12,882.00	89.17	147.390	11,977.44	31.01	1,411.91	819.79	0.74	0.23	-0.70	
12,976.00	88.82	151.580	11,979.09	-49.94	1,459.62	913.20	4.47	-0.37	4.46	
13,071.00	88.73	151.450	11,981.12	-133.42	1,504.92	1,007.20	0.17	-0.09	-0.14	
13,165.00	88.60	151.670	11,983.31	-216.06	1,549.67	1,100.19	0.27	-0.14	0.23	
13,260.00	88.82	150.430	11,985.45	-299.16	1,595.64	1,194.28	1.33	0.23	-1.31	
13,354.00	89.31	147.960	11,986.99	-379.88	1,643.77	1,287.76	2.68	0.52	-2.63	
13,447.00	89.04	147.080	11,988.33	-458.33	1,693.71	1,380.49	0.99	-0.29	-0.95	
13,541.00	89.22	147.660	11,989.75	-537.48	1,744.39	1,474.24	0.65	0.19	0.62	



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
13,633.00	89.26	147.520	11,990.97	-615.14	1,793.69	1,565.97	0.16	0.04	-0.15
13,727.00	89.97	147.040	11,991.61	-694.23	1,844.50	1,659.73	0.91	0.76	-0.51
13,820.00	90.01	149.370	11,991.62	-773.26	1,893.50	1,752.38	2.51	0.04	2.51
13,913.00	89.62	152.060	11,991.92	-854.37	1,938.98	1,844.58	2.92	-0.42	2.89
14,006.00	89.66	151.220	11,992.51	-936.21	1,983.16	1,936.59	0.90	0.04	-0.90
14,100.00	89.66	151.000	11,993.06	-1,018.51	2,028.57	2,029.70	0.23	0.00	-0.23
14,193.00	89.93	149.680	11,993.40	-1,099.32	2,074.59	2,121.99	1.45	0.29	-1.42
14,287.00	90.01	148.930	11,993.45	-1,180.15	2,122.58	2,215.47	0.80	0.09	-0.80
14,379.00	88.82	149.950	11,994.39	-1,259.36	2,169.35	2,306.92	1.70	-1.29	1.11
14,472.00	88.91	149.810	11,996.23	-1,339.79	2,216.01	2,399.29	0.18	0.10	-0.15
14,564.00	88.95	149.990	11,997.95	-1,419.37	2,262.14	2,490.65	0.20	0.04	0.20
14,657.00	88.91	149.810	11,999.68	-1,499.82	2,308.77	2,583.01	0.20	-0.04	-0.19
14,750.00	89.40	148.580	12,001.05	-1,579.68	2,356.39	2,675.50	1.42	0.53	-1.32
14,844.00	89.31	149.420	12,002.11	-1,660.25	2,404.80	2,769.02	0.90	-0.10	0.89
14,938.00	89.26	150.780	12,003.29	-1,741.73	2,451.66	2,862.34	1.45	-0.05	1.45
15,031.00	89.04	149.290	12,004.67	-1,822.29	2,498.10	2,954.68	1.62	-0.24	-1.60
15,124.00	88.95	149.900	12,006.30	-1,902.49	2,545.16	3,047.10	0.66	-0.10	0.66
15,218.00	89.40	149.070	12,007.65	-1,983.46	2,592.88	3,140.53	1.00	0.48	-0.88
15,312.00	89.09	149.680	12,008.89	-2,064.34	2,640.77	3,233.99	0.73	-0.33	0.65
15,405.00	88.95	149.240	12,010.48	-2,144.43	2,688.02	3,326.43	0.50	-0.15	-0.47
15,498.00	88.82	150.300	12,012.29	-2,224.76	2,734.83	3,418.81	1.15	-0.14	1.14
15,591.00	88.95	149.370	12,014.10	-2,305.15	2,781.55	3,511.18	1.01	0.14	-1.00
15,684.00	89.00	149.420	12,015.76	-2,385.18	2,828.89	3,603.63	0.08	0.05	0.05
15,777.00	89.00	149.110	12,017.39	-2,465.11	2,876.41	3,696.11	0.33	0.00	-0.33
15,870.00	88.78	149.510	12,019.19	-2,545.07	2,923.87	3,788.57	0.49	-0.24	0.43
15,962.00	88.47	149.860	12,021.39	-2,624.47	2,970.29	3,879.96	0.51	-0.34	0.38
16,056.00	88.69	149.460	12,023.72	-2,705.57	3,017.76	3,973.35	0.49	0.23	-0.43
16,149.00	88.47	149.810	12,026.03	-2,785.78	3,064.76	4,065.75	0.44	-0.24	0.38
16,242.00	88.69	149.420	12,028.33	-2,865.99	3,111.79	4,158.14	0.48	0.24	-0.42
16,335.00	88.51	151.220	12,030.61	-2,946.76	3,157.82	4,250.41	1.94	-0.19	1.94
16,429.00	88.56	149.200	12,033.01	-3,028.30	3,204.50	4,343.68	2.15	0.05	-2.15
16,522.00	88.86	148.710	12,035.10	-3,107.96	3,252.45	4,436.20	0.62	0.32	-0.53
16,614.00	88.60	150.960	12,037.14	-3,187.48	3,298.67	4,527.56	2.46	-0.28	2.45
16,708.00	88.82	148.890	12,039.26	-3,268.80	3,345.76	4,620.90	2.21	0.23	-2.20
16,801.00	88.73	149.070	12,041.25	-3,348.48	3,393.67	4,713.41	0.22	-0.10	0.19
16,894.00	88.51	149.640	12,043.49	-3,428.47	3,441.06	4,805.86	0.66	0.24	0.61
16,988.00	88.78	150.560	12,045.71	-3,509.93	3,487.91	4,899.16	1.02	0.29	0.96
17,081.00	88.86	150.920	12,047.63	-3,591.05	3,533.35	4,991.35	0.40	0.09	0.39
17,174.00	88.91	151.270	12,049.43	-3,672.45	3,578.30	5,083.47	0.38	0.05	0.38
17,267.00	89.00	151.000	12,051.13	-3,753.88	3,623.19	5,175.57	0.31	0.10	-0.29
17,361.00	88.91	149.680	12,052.85	-3,835.55	3,669.69	5,268.84	1.41	-0.10	-1.40
17,453.00	88.69	149.730	12,054.77	-3,914.97	3,716.09	5,360.24	0.25	-0.24	0.05
17,546.00	88.82	149.240	12,056.79	-3,995.07	3,763.30	5,452.66	0.54	0.14	-0.53

RECEIVED
Office of Oil and Gas
JAN 29 2024
Department of Environmental Protection



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
17,639.00	89.00	149.510	12,058.56	-4,075.08	3,810.67	5,545.12	0.35	0.19	0.29
17,732.00	89.22	148.230	12,060.01	-4,154.68	3,858.74	5,637.66	1.40	0.24	-1.38
17,826.00	89.00	149.070	12,061.47	-4,234.94	3,907.64	5,731.23	0.92	-0.23	0.89
17,919.00	88.95	151.000	12,063.13	-4,315.50	3,954.08	5,823.56	2.08	-0.05	2.08
18,013.00	89.04	149.370	12,064.78	-4,397.04	4,000.81	5,916.86	1.74	0.10	-1.73
18,106.00	88.91	149.730	12,066.44	-4,477.20	4,047.93	6,009.28	0.41	-0.14	0.39
18,200.00	88.82	148.980	12,068.30	-4,558.05	4,095.84	6,102.73	0.80	-0.10	-0.80
18,293.00	88.95	149.070	12,070.11	-4,637.78	4,143.69	6,195.24	0.17	0.14	0.10
18,387.00	88.95	148.800	12,071.84	-4,718.28	4,192.19	6,288.77	0.29	0.00	-0.29
18,480.00	89.04	148.620	12,073.47	-4,797.74	4,240.48	6,381.33	0.22	0.10	-0.19
18,574.00	88.82	149.290	12,075.22	-4,878.26	4,288.95	6,474.85	0.75	-0.23	0.71
18,667.00	89.09	150.080	12,076.92	-4,958.53	4,335.89	6,567.25	0.90	0.29	0.85
18,760.00	88.95	148.850	12,078.51	-5,038.62	4,383.13	6,659.69	1.33	-0.15	-1.32
18,854.00	89.04	148.400	12,080.16	-5,118.87	4,432.06	6,753.26	0.49	0.10	-0.48
18,947.00	88.60	149.680	12,082.07	-5,198.60	4,479.89	6,845.77	1.46	-0.47	1.38
19,040.00	88.42	150.170	12,084.49	-5,279.05	4,526.48	6,938.11	0.56	-0.19	0.53
19,133.00	88.51	149.510	12,086.98	-5,359.43	4,573.19	7,030.46	0.72	0.10	-0.71
19,226.00	88.78	149.290	12,089.18	-5,439.46	4,620.52	7,122.90	0.37	0.29	-0.24
19,320.00	88.47	150.170	12,091.44	-5,520.62	4,667.89	7,216.27	0.99	-0.33	0.94
19,413.00	89.00	149.290	12,093.49	-5,600.92	4,714.75	7,308.65	1.10	0.57	-0.95
19,506.00	88.64	150.870	12,095.41	-5,681.50	4,761.13	7,400.97	1.74	-0.39	1.70
19,599.00	88.86	150.560	12,097.44	-5,762.60	4,806.61	7,493.16	0.41	0.24	-0.33
19,691.00	88.51	151.220	12,099.55	-5,842.95	4,851.35	7,584.32	0.81	-0.38	0.72
19,785.00	88.82	150.610	12,101.74	-5,925.08	4,897.04	7,677.46	0.73	0.33	-0.65
19,878.00	88.78	152.330	12,103.69	-6,006.76	4,941.44	7,769.48	1.85	-0.04	1.85
19,971.00	89.40	151.050	12,105.16	-6,088.63	4,985.54	7,861.46	1.53	0.67	-1.38
20,064.00	89.13	148.800	12,106.36	-6,169.09	5,032.14	7,953.82	2.44	-0.29	-2.42
20,158.00	88.91	147.300	12,107.96	-6,248.84	5,081.87	8,047.48	1.61	-0.23	-1.60
20,251.00	88.64	147.440	12,109.95	-6,327.14	5,132.01	8,140.22	0.33	-0.29	0.15
20,344.00	88.95	148.400	12,111.91	-6,405.93	5,181.39	8,232.89	1.08	0.33	1.03
20,438.00	88.91	151.310	12,113.66	-6,487.19	5,228.58	8,326.24	3.10	-0.04	3.10
20,531.00	89.26	148.710	12,115.15	-6,567.72	5,275.06	8,418.57	2.82	0.38	-2.80
20,624.00	89.40	148.100	12,116.24	-6,646.93	5,323.78	8,511.19	0.67	0.15	-0.66
20,717.00	89.09	149.150	12,117.46	-6,726.32	5,372.19	8,603.77	1.18	-0.33	1.13
20,811.00	89.26	148.980	12,118.81	-6,806.94	5,420.51	8,697.28	0.26	0.18	-0.18
20,904.00	89.40	150.210	12,119.90	-6,887.15	5,467.57	8,789.70	1.33	0.15	1.32
20,998.00	89.00	150.080	12,121.21	-6,968.66	5,514.36	8,883.02	0.45	0.15	-0.14
21,091.00	89.35	148.980	12,122.55	-7,048.81	5,561.52	8,975.45	1.24	0.38	-1.18
21,184.00	89.13	148.450	12,123.79	-7,128.28	5,609.81	9,068.02	0.62	-0.24	-0.57
21,278.00	89.01	150.390	12,125.31	-7,209.19	5,657.62	9,161.46	2.07	-0.13	2.06
21,372.00	88.35	150.210	12,127.48	-7,290.82	5,704.18	9,254.72	0.73	-0.70	-0.19
21,465.00	89.76	150.910	12,129.01	-7,371.80	5,749.88	9,346.95	1.69	1.52	0.75
21,559.00	89.05	148.540	12,129.99	-7,452.97	5,797.27	9,440.34	2.63	-0.76	-2.52

RECEIVED
Office of Oil and Gas
JAN 23 2024
WV Department of Environmental Protection



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
21,653.00	89.01	151.000	12,131.58	-7,534.17	5,844.58	9,533.72	2.62	-0.04	2.62
21,746.00	88.26	152.500	12,133.80	-7,616.06	5,888.59	9,625.67	1.80	-0.81	1.61
21,839.00	88.22	153.290	12,136.65	-7,698.81	5,930.94	9,717.31	0.85	-0.04	0.85
21,932.00	88.26	152.410	12,139.51	-7,781.52	5,973.36	9,808.96	0.95	0.04	-0.95
22,025.00	88.31	151.000	12,142.29	-7,863.37	6,017.42	9,900.91	1.52	0.05	-1.52
22,118.00	88.13	149.160	12,145.18	-7,943.93	6,063.78	9,993.20	1.99	-0.19	-1.98
22,211.00	90.20	148.010	12,146.54	-8,023.29	6,112.25	10,085.79	2.55	2.23	-1.24
22,303.00	90.11	148.100	12,146.29	-8,101.35	6,160.93	10,177.46	0.14	-0.10	0.10
22,397.00	89.41	148.720	12,146.68	-8,181.42	6,210.17	10,271.08	0.99	-0.74	0.66
22,490.00	90.07	148.010	12,147.10	-8,260.60	6,258.94	10,363.71	1.04	0.71	-0.76
22,584.00	89.54	148.360	12,147.42	-8,340.48	6,308.50	10,457.36	0.68	-0.56	0.37
22,677.00	89.85	147.660	12,147.92	-8,419.35	6,357.77	10,550.04	0.82	0.33	-0.75
22,770.00	89.63	148.100	12,148.34	-8,498.12	6,407.21	10,642.74	0.53	-0.24	0.47
22,863.00	88.92	148.010	12,149.52	-8,577.03	6,456.42	10,735.40	0.77	-0.76	-0.10
22,957.00	90.51	148.980	12,149.98	-8,657.17	6,505.53	10,829.00	1.98	1.69	1.03
23,050.00	90.07	148.540	12,149.51	-8,736.68	6,553.77	10,921.57	0.67	-0.47	-0.47
23,143.00	90.24	148.800	12,149.26	-8,816.12	6,602.12	11,014.16	0.33	0.18	0.28
Survey @ 23143.00 MD 12149.26 TVD									
23,199.00	90.24	148.800	12,149.03	-8,864.02	6,631.13	11,069.90	0.00	0.00	0.00
Survey proj. to 23199.00 MD 12149.03 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
182.50	182.50	0.14	-0.10	MWD surveys
23,143.00	12,149.26	-8,816.12	6,602.12	Survey @ 23143.00 MD 12149.26 TVD

RECEIVED
Office of Oil and Gas
JAN 29 2024
WV Department of
Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Project	Marshall County, West Virginia NAD83 UTM 17N		
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:	14,465,184.757 usft	Latitude:	39.830374010
From:	Lat/Long	Easting:	1,745,068.182 usft	Longitude:	-80.627233790
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.24 "

Well	Breckenridge S-21 HU (slot U)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,138.995 usft	Latitude:	39.830246060
	+E/-W	0.00 ft	Easting:	1,745,266.919 usft	Longitude:	-80.626526590
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,370.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	10/22/2022	-8.72	66.43	51,619.54046176

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	143.257	

Survey Program	Date	12/3/2022			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
182.50	1,185.50	MWD surf (Original Hole)	MWD	MWD - Standard	<p>RECEIVED Office of Oil and Gas JAN 29 2024 WV Department of Environmental Protection</p>
1,212.50	3,016.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,076.50	4,376.50	MWD 2996-4356 MD (Original Hole)	MWD	MWD - Standard	
4,407.50	5,291.50	MWD 4407.5 - 5291.5 MD (Original Hole)	MWD	MWD - Standard	
5,343.00	9,731.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
9,823.00	23,143.00	MWD (Original Hole)	MWD	MWD - Standard	
23,199.00	23,199.00	Projection (Original Hole)	MWD	MWD - Standard	

Survey										
Measured	Inclination (°)	Azimuth (°)	Vertical	+N/-S (ft)	+E/-W (ft)	Map	Map	Latitude	Longitude	
Depth (ft)			Depth (ft)			Northing (usft)	Easting (usft)			
0.00	0.00	0.000	0.00	0.00	0.00	14,465,138.995	1,745,266.919	39.830246060	-80.626526590	
182.50	0.11	323.440	182.50	0.14	-0.10	14,465,139.136	1,745,266.814	39.830246448	-80.626526960	
MWD surveys										
210.50	0.20	67.670	210.50	0.18	-0.08	14,465,139.176	1,745,266.843	39.830246558	-80.626526855	
240.50	0.11	71.240	240.50	0.21	0.00	14,465,139.205	1,745,266.919	39.830246637	-80.626526585	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

RECEIVED
Office of Oil and Gas

Survey

JAN 29 2024
WV Department of Environmental Protection

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
267.50	0.15	52.820	267.50	0.24	0.05	14,465,139.235	1,745,266.972	39.830246718	-80.626526397
297.50	0.10	353.800	297.50	0.29	0.08	14,465,139.284	1,745,267.000	39.830246855	-80.626526295
326.50	0.11	333.810	326.50	0.34	0.07	14,465,139.335	1,745,266.985	39.830246992	-80.626526348
358.50	0.09	308.410	358.50	0.38	0.03	14,465,139.378	1,745,266.952	39.830247111	-80.626526465
389.50	0.15	291.750	389.50	0.41	-0.02	14,465,139.408	1,745,266.895	39.830247195	-80.626526667
421.50	0.22	314.050	421.50	0.47	-0.11	14,465,139.466	1,745,266.812	39.830247356	-80.626526962
452.50	0.11	305.420	452.50	0.53	-0.17	14,465,139.525	1,745,266.745	39.830247517	-80.626527200
484.50	0.19	341.740	484.50	0.60	-0.22	14,465,139.593	1,745,266.704	39.830247705	-80.626527347
515.50	0.19	334.560	515.50	0.69	-0.25	14,465,139.688	1,745,266.665	39.830247967	-80.626527482
547.50	0.11	326.550	547.50	0.77	-0.29	14,465,139.762	1,745,266.626	39.830248170	-80.626527622
579.50	0.27	317.550	579.50	0.85	-0.36	14,465,139.843	1,745,266.558	39.830248394	-80.626527863
611.50	0.28	325.910	611.50	0.97	-0.46	14,465,139.963	1,745,266.463	39.830248725	-80.626528198
642.50	0.36	296.560	642.50	1.07	-0.59	14,465,140.070	1,745,266.334	39.830249019	-80.626528658
674.50	0.29	322.600	674.50	1.18	-0.72	14,465,140.179	1,745,266.194	39.830249320	-80.626529152
706.50	0.27	312.690	706.50	1.30	-0.83	14,465,140.294	1,745,266.090	39.830249639	-80.626529523
738.50	0.29	290.140	738.50	1.38	-0.96	14,465,140.373	1,745,265.958	39.830249857	-80.626529990
769.50	0.40	311.040	769.50	1.48	-1.12	14,465,140.471	1,745,265.803	39.830250128	-80.626530542
801.50	0.42	320.010	801.50	1.64	-1.28	14,465,140.635	1,745,265.643	39.830250578	-80.626531108
832.50	0.40	317.420	832.49	1.81	-1.42	14,465,140.801	1,745,265.497	39.830251038	-80.626531626
864.50	0.44	301.130	864.49	1.95	-1.60	14,465,140.947	1,745,265.316	39.830251440	-80.626532268
895.50	0.48	302.210	895.49	2.08	-1.81	14,465,141.078	1,745,265.105	39.830251802	-80.626533020
927.50	0.40	314.630	927.49	2.23	-2.01	14,465,141.228	1,745,264.912	39.830252215	-80.626533705
959.50	0.50	317.570	959.49	2.41	-2.18	14,465,141.409	1,745,264.738	39.830252716	-80.626534321
990.50	0.40	322.540	990.49	2.60	-2.34	14,465,141.595	1,745,264.581	39.830253228	-80.626534878
1,022.50	0.40	316.120	1,022.49	2.77	-2.48	14,465,141.764	1,745,264.436	39.830253694	-80.626535393
1,053.50	0.53	325.750	1,053.49	2.97	-2.64	14,465,141.961	1,745,264.280	39.830254236	-80.626535945
1,085.50	0.52	321.070	1,085.49	3.20	-2.81	14,465,142.196	1,745,264.105	39.830254884	-80.626536563
1,117.50	0.43	314.980	1,117.49	3.40	-2.99	14,465,142.394	1,745,263.929	39.830255429	-80.626537187
1,148.50	0.49	318.630	1,148.48	3.58	-3.16	14,465,142.576	1,745,263.759	39.830255930	-80.626537790
1,185.50	0.50	315.330	1,185.48	3.81	-3.38	14,465,142.809	1,745,263.541	39.830256574	-80.626538563
1,212.50	0.32	295.050	1,212.48	3.93	-3.53	14,465,142.925	1,745,263.390	39.830256893	-80.626539100
1,244.50	0.25	335.110	1,244.48	4.03	-3.64	14,465,143.026	1,745,263.280	39.830257172	-80.626539491
1,274.50	0.28	321.200	1,274.48	4.15	-3.71	14,465,143.142	1,745,263.206	39.830257493	-80.626539751
1,306.50	0.19	9.280	1,306.48	4.26	-3.75	14,465,143.256	1,745,263.166	39.830257805	-80.626539894
1,338.50	0.27	341.820	1,338.48	4.38	-3.77	14,465,143.380	1,745,263.151	39.830258145	-80.626539945
1,369.50	0.30	16.860	1,369.48	4.53	-3.77	14,465,143.527	1,745,263.152	39.830258549	-80.626539940
1,401.50	0.38	44.100	1,401.48	4.69	-3.67	14,465,143.683	1,745,263.250	39.830258978	-80.626539588
1,433.50	0.39	45.920	1,433.48	4.84	-3.52	14,465,143.835	1,745,263.402	39.830259333	-80.626539044
1,464.50	0.54	63.520	1,464.48	4.98	-3.31	14,465,143.974	1,745,263.609	39.830259771	-80.626538307
1,496.50	0.61	56.740	1,496.48	5.14	-3.03	14,465,144.134	1,745,263.886	39.830260209	-80.626537316
1,528.50	0.62	72.500	1,528.48	5.28	-2.73	14,465,144.280	1,745,264.193	39.830260605	-80.626536218
1,559.50	0.52	69.760	1,559.47	5.38	-2.43	14,465,144.379	1,745,264.485	39.830260874	-80.626535177
1,591.50	0.45	53.820	1,591.47	5.51	-2.20	14,465,144.503	1,745,264.723	39.830261213	-80.626534329
1,621.50	0.50	47.520	1,621.47	5.67	-2.00	14,465,144.661	1,745,264.915	39.830261645	-80.626533644
1,653.50	0.44	46.780	1,653.47	5.84	-1.81	14,465,144.840	1,745,265.107	39.830262132	-80.626532955
1,685.50	0.44	37.580	1,685.47	6.03	-1.65	14,465,145.021	1,745,265.272	39.830262629	-80.626532367
1,728.50	0.55	58.720	1,728.47	6.26	-1.37	14,465,145.259	1,745,265.549	39.830263280	-80.626531376
1,750.50	0.46	83.280	1,750.47	6.33	-1.19	14,465,145.324	1,745,265.727	39.830263456	-80.626530742
1,781.50	0.28	98.420	1,781.47	6.33	-0.99	14,465,145.328	1,745,265.925	39.830263464	-80.626530034
1,813.50	0.36	91.470	1,813.47	6.32	-0.82	14,465,145.314	1,745,266.103	39.830263423	-80.626529401
1,845.50	0.15	52.990	1,845.47	6.34	-0.68	14,465,145.337	1,745,266.237	39.830263484	-80.626528924
1,877.50	0.36	94.210	1,877.47	6.36	-0.55	14,465,145.354	1,745,266.371	39.830263531	-80.626528447
1,907.50	0.38	59.770	1,907.46	6.40	-0.37	14,465,145.398	1,745,266.551	39.830263648	-80.626527806
1,939.50	0.42	81.970	1,939.46	6.47	-0.16	14,465,145.467	1,745,266.759	39.830263837	-80.626527064



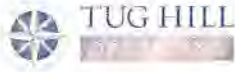
Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,971.50	0.40	58.580	1,971.46	6.55	0.05	14,465,145.542	1,745,266.970	39.830264039	-80.626526310
2,002.50	0.19	35.390	2,002.46	6.65	0.17	14,465,145.640	1,745,267.092	39.830264308	-80.626525874
2,034.50	0.39	70.780	2,034.46	6.72	0.31	14,465,145.719	1,745,267.226	39.830264524	-80.626525397
2,066.50	0.58	30.670	2,066.46	6.90	0.49	14,465,145.895	1,745,267.411	39.830265003	-80.626524734
2,098.50	0.95	27.450	2,098.46	7.27	0.70	14,465,146.269	1,745,267.616	39.830266029	-80.626523998
2,130.50	1.75	27.830	2,130.45	7.94	1.05	14,465,146.937	1,745,267.966	39.830267859	-80.626522740
2,161.50	2.68	33.590	2,161.43	8.96	1.67	14,465,147.959	1,745,268.588	39.830270659	-80.626520510
2,193.50	3.38	28.730	2,193.38	10.41	2.54	14,465,149.410	1,745,269.456	39.830274632	-80.626517399
2,224.50	3.94	29.810	2,224.32	12.14	3.51	14,465,151.135	1,745,270.424	39.830279360	-80.626513922
2,256.50	4.20	28.210	2,256.24	14.13	4.61	14,465,153.122	1,745,271.525	39.830284802	-80.626509973
2,287.50	4.32	27.120	2,287.15	16.17	5.68	14,465,155.161	1,745,272.594	39.830290391	-80.626506136
2,319.50	4.27	29.360	2,319.06	18.28	6.81	14,465,157.272	1,745,273.727	39.830296175	-80.626502067
2,351.50	4.28	34.590	2,350.97	20.30	8.07	14,465,159.293	1,745,274.989	39.830301712	-80.626497542
2,382.50	4.04	34.350	2,381.89	22.15	9.34	14,465,161.147	1,745,276.262	39.830306789	-80.626492980
2,413.50	3.15	29.830	2,412.83	23.79	10.38	14,465,162.788	1,745,277.302	39.830311282	-80.626489252
2,444.50	2.37	27.160	2,443.79	25.10	11.10	14,465,164.097	1,745,278.018	39.830314869	-80.626486681
2,476.50	2.05	34.400	2,475.77	26.16	11.72	14,465,165.158	1,745,278.644	39.830317775	-80.626484438
2,508.50	2.06	27.570	2,507.75	27.15	12.31	14,465,166.140	1,745,279.233	39.830320465	-80.626482323
2,539.50	1.96	30.450	2,538.73	28.10	12.84	14,465,167.091	1,745,279.760	39.830323071	-80.626480434
2,571.50	2.35	30.030	2,570.71	29.14	13.45	14,465,168.131	1,745,280.365	39.830325919	-80.626478261
2,603.50	2.48	24.430	2,602.68	30.33	14.06	14,465,169.329	1,745,280.980	39.830329203	-80.626476054
2,635.50	2.67	22.940	2,634.65	31.65	14.64	14,465,170.646	1,745,281.557	39.830332812	-80.626473980
2,666.50	2.75	27.420	2,665.61	32.98	15.26	14,465,171.971	1,745,282.181	39.830336444	-80.626471738
2,698.50	2.81	27.310	2,697.57	34.35	15.98	14,465,173.349	1,745,282.894	39.830340221	-80.626469176
2,730.50	2.75	24.450	2,729.54	35.75	16.65	14,465,174.745	1,745,283.572	39.830344047	-80.626466742
2,761.50	2.56	25.140	2,760.50	37.05	17.26	14,465,176.049	1,745,284.174	39.830347620	-80.626464579
2,793.50	2.36	27.370	2,792.47	38.29	17.86	14,465,177.281	1,745,284.780	39.830350996	-80.626462400
2,824.50	2.30	34.780	2,823.45	39.36	18.51	14,465,178.358	1,745,285.428	39.830353949	-80.626460075
2,856.50	2.01	42.600	2,855.43	40.30	19.26	14,465,179.299	1,745,286.175	39.830356523	-80.626457403
2,888.50	1.86	42.270	2,887.41	41.10	19.99	14,465,180.096	1,745,286.904	39.830358704	-80.626454794
2,919.50	1.86	40.190	2,918.39	41.86	20.65	14,465,180.853	1,745,287.567	39.830360774	-80.626452421
2,950.50	1.87	39.350	2,949.37	42.63	21.29	14,465,181.628	1,745,288.212	39.830362897	-80.626450111
2,981.50	1.71	33.140	2,980.36	43.41	21.87	14,465,182.407	1,745,288.786	39.830365028	-80.626448056
3,016.50	1.49	25.960	3,015.35	44.26	22.35	14,465,183.253	1,745,289.270	39.830367347	-80.626446317
3,076.50	1.61	18.260	3,075.32	45.76	22.96	14,465,184.755	1,745,289.876	39.830371464	-80.626444138
3,107.50	1.90	21.420	3,106.31	46.65	23.28	14,465,185.647	1,745,290.200	39.830373910	-80.626442970
3,138.50	2.25	19.610	3,137.29	47.70	23.67	14,465,186.698	1,745,290.592	39.830376793	-80.626441559
3,170.50	2.91	22.060	3,169.26	49.05	24.19	14,465,188.043	1,745,291.108	39.830380480	-80.626439701
3,202.50	3.58	23.780	3,201.20	50.72	24.90	14,465,189.710	1,745,291.816	39.830385050	-80.626437155
3,234.50	4.48	25.280	3,233.13	52.76	25.83	14,465,191.754	1,745,292.752	39.830390653	-80.626433788
3,266.50	5.60	26.850	3,265.00	55.28	27.07	14,465,194.278	1,745,293.991	39.830397568	-80.626429338
3,298.50	6.63	28.690	3,296.82	58.30	28.66	14,465,197.291	1,745,295.583	39.830405826	-80.626423622
3,330.50	7.52	33.520	3,328.57	61.66	30.71	14,465,200.658	1,745,297.627	39.830415047	-80.626416294
3,361.50	8.30	40.140	3,359.28	65.06	33.27	14,465,204.059	1,745,300.189	39.830424360	-80.626407116
3,393.50	8.72	42.870	3,390.93	68.61	36.41	14,465,207.603	1,745,303.329	39.830434055	-80.626395881
3,425.50	8.88	44.400	3,422.55	72.15	39.79	14,465,211.145	1,745,306.707	39.830443745	-80.626383795
3,456.50	8.91	48.040	3,453.18	75.47	43.25	14,465,214.460	1,745,310.166	39.830452808	-80.626371424
3,488.50	8.42	53.670	3,484.81	78.51	46.98	14,465,217.505	1,745,313.897	39.830461127	-80.626358092
3,519.50	8.15	58.570	3,515.49	81.00	50.68	14,465,219.995	1,745,317.600	39.830467924	-80.626344863
3,552.50	7.43	63.340	3,548.19	83.18	54.58	14,465,222.173	1,745,321.503	39.830473858	-80.626330929
3,583.50	6.67	64.230	3,578.95	84.86	58.00	14,465,223.855	1,745,324.915	39.830478438	-80.626318749
3,615.50	5.10	59.170	3,610.78	86.40	60.89	14,465,225.392	1,745,327.811	39.830482626	-80.626308414
3,646.50	4.09	48.550	3,641.68	87.83	62.90	14,465,226.830	1,745,329.822	39.830486552	-80.626301226
3,678.50	3.52	36.330	3,673.61	89.38	64.34	14,465,228.376	1,745,331.260	39.830490784	-80.626296084



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,710.50	3.65	24.490	3,705.55	91.10	65.35	14,465,230.095	1,745,332.264	39.830495491	-80.626292481
3,741.50	4.71	12.880	3,736.47	93.24	66.04	14,465,232.234	1,745,332.957	39.830501357	-80.626289982
3,773.50	5.94	8.130	3,768.33	96.16	66.57	14,465,235.154	1,745,333.484	39.830509370	-80.626288061
3,804.50	7.10	7.720	3,799.13	99.65	67.05	14,465,238.640	1,745,333.968	39.830518939	-80.626286284
3,836.50	8.11	9.000	3,830.85	103.83	67.67	14,465,242.829	1,745,334.587	39.830530436	-80.626284018
3,868.50	9.25	11.890	3,862.48	108.58	68.55	14,465,247.576	1,745,335.470	39.830543460	-80.626280802
3,900.50	10.51	14.630	3,894.01	113.92	69.82	14,465,252.916	1,745,336.737	39.830558113	-80.626276209
3,932.50	11.41	19.540	3,925.42	119.73	71.61	14,465,258.724	1,745,338.533	39.830574040	-80.626269726
3,963.50	11.69	26.180	3,955.80	125.44	74.03	14,465,264.432	1,745,340.944	39.830589688	-80.626261052
3,995.50	11.21	33.530	3,987.16	130.94	77.17	14,465,269.934	1,745,344.093	39.830604763	-80.626249755
4,026.50	10.75	40.920	4,017.59	135.64	80.73	14,465,274.631	1,745,347.651	39.830617621	-80.626237011
4,058.50	10.13	46.330	4,049.06	139.83	84.72	14,465,278.829	1,745,351.642	39.830629105	-80.626222735
4,089.50	9.40	49.140	4,079.62	143.37	88.61	14,465,282.368	1,745,355.528	39.830638778	-80.626208838
4,121.50	7.94	50.990	4,111.25	146.47	92.30	14,465,285.469	1,745,359.222	39.830647251	-80.626195634
4,152.50	7.49	50.720	4,141.97	149.10	95.53	14,465,288.096	1,745,362.450	39.830654429	-80.626184098
4,185.50	7.16	49.410	4,174.70	151.80	98.76	14,465,290.796	1,745,365.676	39.830661806	-80.626172565
4,217.50	6.94	48.370	4,206.46	154.38	101.72	14,465,293.378	1,745,368.836	39.830668862	-80.626161986
4,248.50	6.87	46.280	4,237.23	156.91	104.46	14,465,295.903	1,745,371.376	39.830675766	-80.626152189
4,280.50	6.85	44.400	4,269.00	159.59	107.18	14,465,298.589	1,745,374.094	39.830683112	-80.626142466
4,312.50	7.31	42.200	4,300.76	162.47	109.88	14,465,301.461	1,745,376.797	39.830690967	-80.626132797
4,344.50	7.73	39.480	4,332.48	165.64	112.61	14,465,304.630	1,745,379.533	39.830699639	-80.626123005
4,376.50	7.94	36.950	4,364.19	169.06	115.31	14,465,308.058	1,745,382.230	39.830709020	-80.626113348
4,407.50	8.11	31.030	4,394.88	172.65	117.73	14,465,311.643	1,745,384.644	39.830718838	-80.626104695
4,439.50	8.13	33.300	4,426.56	176.47	120.13	14,465,315.468	1,745,387.050	39.830729315	-80.626096068
4,470.50	8.25	31.690	4,457.25	180.20	122.50	14,465,319.193	1,745,389.421	39.830739517	-80.626087565
4,501.50	8.51	29.810	4,487.91	184.08	124.81	14,465,323.075	1,745,391.730	39.830750153	-80.626079284
4,533.50	8.38	30.210	4,519.57	188.15	127.16	14,465,327.145	1,745,394.080	39.830761302	-80.626070851
4,565.50	7.86	32.520	4,551.25	192.01	129.51	14,465,331.005	1,745,396.430	39.830771875	-80.626062425
4,596.50	7.61	33.230	4,581.96	195.51	131.78	14,465,334.509	1,745,398.694	39.830781473	-80.626054307
4,627.50	7.65	32.430	4,612.69	198.97	134.01	14,465,337.968	1,745,400.926	39.830790945	-80.626046307
4,659.50	7.82	31.960	4,644.40	202.62	136.30	14,465,341.613	1,745,403.220	39.830800928	-80.626038080
4,690.50	8.00	30.140	4,675.10	206.27	138.50	14,465,345.267	1,745,405.420	39.830810940	-80.626030191
4,722.50	8.37	29.700	4,706.78	210.22	140.77	14,465,349.216	1,745,407.692	39.830821758	-80.626022040
4,753.50	8.68	28.350	4,737.44	214.24	143.00	14,465,353.235	1,745,409.921	39.830832768	-80.626014041
4,785.50	9.11	28.500	4,769.05	218.59	145.36	14,465,357.586	1,745,412.276	39.830844691	-80.626005587
4,817.50	9.43	29.870	4,800.63	223.09	147.87	14,465,362.086	1,745,414.790	39.830857019	-80.625996564
4,849.50	9.78	30.940	4,832.18	227.70	150.57	14,465,366.690	1,745,417.493	39.830869632	-80.625986868
4,880.50	9.84	33.050	4,862.73	232.17	153.37	14,465,371.168	1,745,420.292	39.830881899	-80.625976833
4,912.50	8.78	36.120	4,894.31	236.44	156.30	14,465,375.433	1,745,423.223	39.830893578	-80.625966330
4,943.50	8.26	38.900	4,924.97	240.08	159.10	14,465,379.078	1,745,426.016	39.830903554	-80.625956327
4,975.50	8.10	39.390	4,956.64	243.61	161.97	14,465,382.609	1,745,428.890	39.830913218	-80.625946037
5,006.50	7.98	39.040	4,987.34	246.97	164.71	14,465,385.968	1,745,431.631	39.830922412	-80.625936223
5,038.50	8.19	37.480	5,019.02	250.51	167.50	14,465,389.502	1,745,434.417	39.830932085	-80.625926247
5,070.50	8.45	36.330	5,050.68	254.21	170.28	14,465,393.205	1,745,437.197	39.830942222	-80.625916290
5,101.50	8.60	34.550	5,081.34	257.95	172.94	14,465,396.949	1,745,439.861	39.830952473	-80.625906746
5,133.50	8.97	33.780	5,112.96	262.00	175.69	14,465,400.993	1,745,442.605	39.830963548	-80.625896912
5,164.50	9.17	32.190	5,143.58	266.10	178.35	14,465,405.092	1,745,445.264	39.830974774	-80.625887377
5,196.50	9.27	31.770	5,175.16	270.45	181.06	14,465,409.441	1,745,447.980	39.830986687	-80.625877640
5,227.50	8.72	32.560	5,205.78	274.55	183.64	14,465,413.545	1,745,450.559	39.830997926	-80.625868392
5,259.50	8.50	33.370	5,237.42	278.57	186.25	14,465,417.564	1,745,453.165	39.831008934	-80.625859049
5,291.50	7.96	34.400	5,269.09	282.37	188.80	14,465,421.367	1,745,455.718	39.831019349	-80.625849900
5,343.00	8.11	34.960	5,320.09	288.29	192.90	14,465,427.287	1,745,459.814	39.831035558	-80.625835221
5,437.00	8.98	33.150	5,413.04	299.87	200.71	14,465,438.863	1,745,467.625	39.831067260	-80.625807226
5,530.00	10.15	30.870	5,504.75	312.98	208.88	14,465,451.974	1,745,475.799	39.831103171	-80.62577916



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,623.00	10.27	31.140	5,596.27	327.11	217.37	14,465,466.103	1,745,484.291	39.831141875	-80.625747458
5,717.00	8.84	33.770	5,688.97	340.29	225.72	14,465,479.280	1,745,492.639	39.831177966	-80.625717525
5,811.00	7.24	33.060	5,782.04	351.26	232.97	14,465,490.249	1,745,499.886	39.831208006	-80.625691549
5,904.00	7.20	31.870	5,874.30	361.12	239.24	14,465,500.110	1,745,506.160	39.831235014	-80.625669055
5,998.00	8.94	29.800	5,967.37	372.46	245.98	14,465,511.452	1,745,512.900	39.831266082	-80.625644876
6,091.00	8.65	31.020	6,059.28	384.72	253.18	14,465,523.716	1,745,520.096	39.831299679	-80.625619064
6,184.00	7.65	36.870	6,151.34	395.67	260.50	14,465,534.662	1,745,527.414	39.831329655	-80.625592833
6,278.00	6.69	40.590	6,244.60	404.83	267.81	14,465,543.825	1,745,534.731	39.831354736	-80.625566635
6,371.00	7.08	42.020	6,336.93	413.20	275.17	14,465,552.197	1,745,542.092	39.831377641	-80.625540290
6,464.00	7.32	35.270	6,429.20	422.30	282.43	14,465,561.292	1,745,549.350	39.831402535	-80.625514303
6,558.00	6.88	33.690	6,522.48	431.87	289.01	14,465,570.866	1,745,555.930	39.831428751	-80.625490719
6,650.00	7.20	34.220	6,613.79	441.22	295.31	14,465,580.218	1,745,562.229	39.831454361	-80.625468143
6,744.00	8.74	34.780	6,706.87	451.96	302.70	14,465,590.955	1,745,569.616	39.831483764	-80.625441671
6,837.00	8.36	34.250	6,798.84	463.35	310.53	14,465,602.347	1,745,577.452	39.831514958	-80.6254113592
6,930.00	7.18	32.250	6,890.99	473.86	317.44	14,465,612.851	1,745,584.358	39.831543725	-80.625388834
7,023.00	6.85	30.230	6,983.29	483.56	323.33	14,465,622.558	1,745,590.252	39.831570315	-80.625367696
7,118.00	7.29	30.390	7,077.57	493.66	329.24	14,465,632.652	1,745,596.153	39.831597968	-80.625346525
7,210.00	8.22	29.350	7,168.72	504.43	335.41	14,465,643.420	1,745,602.330	39.831627467	-80.625324363
7,304.00	9.16	27.940	7,261.64	516.89	342.21	14,465,655.887	1,745,609.129	39.831661628	-80.625299958
7,398.00	8.52	27.680	7,354.53	529.67	348.95	14,465,668.664	1,745,615.870	39.831696637	-80.625275758
7,490.00	7.80	31.170	7,445.60	541.05	355.35	14,465,680.041	1,745,622.267	39.831727807	-80.625252802
7,583.00	7.90	32.440	7,537.72	551.84	362.04	14,465,690.834	1,745,628.962	39.831757371	-80.625228795
7,677.00	8.25	30.790	7,630.79	563.09	368.96	14,465,702.080	1,745,635.879	39.831788174	-80.625203987
7,771.00	7.63	31.510	7,723.89	574.20	375.68	14,465,713.194	1,745,642.593	39.831818618	-80.625179906
7,864.00	7.04	34.660	7,816.13	584.15	382.14	14,465,723.145	1,745,649.061	39.831845873	-80.625156719
7,957.00	7.25	36.990	7,908.41	593.53	388.92	14,465,732.520	1,745,655.833	39.831871541	-80.625132457
8,143.00	9.39	36.690	8,092.44	615.07	405.04	14,465,754.064	1,745,671.962	39.831930519	-80.625074683
8,237.00	9.70	34.130	8,185.14	627.77	414.07	14,465,766.769	1,745,680.987	39.831965304	-80.625042347
8,330.00	9.09	35.000	8,276.89	640.28	422.68	14,465,779.272	1,745,689.597	39.831999541	-80.625011493
8,424.00	7.66	36.950	8,369.89	651.37	430.70	14,465,790.361	1,745,697.622	39.832029903	-80.624982742
8,517.00	8.02	37.190	8,462.02	661.49	438.35	14,465,800.483	1,745,705.269	39.832057612	-80.624955351
8,704.00	7.26	38.060	8,647.36	681.19	453.52	14,465,820.179	1,745,720.439	39.832111526	-80.624901022
8,798.00	7.99	35.940	8,740.52	691.15	461.02	14,465,830.145	1,745,727.935	39.832138808	-80.624874172
8,892.00	8.37	31.440	8,833.57	702.28	468.42	14,465,841.271	1,745,735.338	39.832169279	-80.624847636
8,985.00	8.85	29.600	8,925.52	714.27	475.49	14,465,853.267	1,745,742.403	39.832202139	-80.624822294
9,079.00	8.91	34.320	9,018.39	726.57	483.16	14,465,865.566	1,745,750.079	39.832235828	-80.624794768
9,172.00	8.98	31.440	9,110.26	738.71	491.01	14,465,877.707	1,745,757.925	39.832269079	-80.624766637
9,266.00	9.35	30.160	9,203.06	751.58	498.67	14,465,890.568	1,745,765.588	39.832304810	-80.624739149
9,359.00	8.19	33.760	9,294.98	763.61	506.15	14,465,902.608	1,745,773.065	39.832337288	-80.624712336
9,451.00	6.66	34.930	9,386.20	773.44	512.84	14,465,912.430	1,745,779.762	39.832364185	-80.624688336
9,544.00	6.37	33.820	9,478.60	782.14	518.80	14,465,921.138	1,745,785.721	39.832388029	-80.624666978
9,638.00	7.37	32.790	9,571.92	791.55	524.97	14,465,930.539	1,745,791.889	39.832413775	-80.624644869
9,731.00	8.11	33.200	9,664.08	802.05	531.79	14,465,941.042	1,745,798.711	39.832442541	-80.624620410
9,823.00	9.20	34.100	9,755.03	813.57	539.47	14,465,952.563	1,745,806.388	39.832474090	-80.624592893
9,917.00	9.13	35.810	9,847.83	825.84	548.05	14,465,964.833	1,745,814.964	39.832507689	-80.624562161
10,010.00	7.75	36.650	9,939.82	836.86	556.11	14,465,975.848	1,745,823.025	39.832537845	-80.624533284
10,104.00	8.18	37.210	10,032.91	847.27	563.93	14,465,986.259	1,745,830.852	39.832566345	-80.624505247
10,197.00	7.41	34.570	10,125.05	857.47	571.34	14,465,996.467	1,745,838.256	39.832594292	-80.624478722
10,290.00	7.16	31.690	10,217.30	867.34	577.79	14,466,006.337	1,745,844.704	39.832621323	-80.624455608
10,383.00	7.85	29.990	10,309.50	877.78	584.01	14,466,016.769	1,745,850.923	39.832649901	-80.624433299
10,476.00	7.32	34.510	10,401.69	888.16	590.54	14,466,027.152	1,745,857.454	39.832678339	-80.624409879
10,570.00	7.52	37.470	10,494.90	897.98	597.67	14,466,036.968	1,745,864.589	39.832705215	-80.624384319
10,663.00	8.41	36.060	10,587.01	908.30	605.38	14,466,047.296	1,745,872.294	39.832733489	-80.624356717
10,815.00	7.03	35.860	10,737.62	924.83	617.37	14,466,063.821	1,745,884.287	39.832778731	-80.624313753

RECEIVED
 West Virginia Department of Environmental Protection
 Oil and Gas
 9/20/24



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,909.00	6.63	44.270	10,830.96	933.38	624.53	14,466,072.369	1,745,891.445	39.832802123	-80.624288128
11,003.00	10.30	53.570	10,923.92	942.26	635.08	14,466,081.249	1,745,901.998	39.832826387	-80.624250404
11,097.00	7.95	58.110	11,016.73	950.68	647.36	14,466,089.675	1,745,914.281	39.832849384	-80.624206526
11,144.00	8.53	70.850	11,063.25	953.54	653.42	14,466,092.535	1,745,920.334	39.832857171	-80.624184922
11,191.00	9.06	87.720	11,109.70	954.83	660.41	14,466,093.826	1,745,927.325	39.832860635	-80.624159999
11,238.00	9.46	104.820	11,156.10	953.99	667.84	14,466,092.985	1,745,934.758	39.832858240	-80.624133535
11,285.00	10.52	117.030	11,202.39	951.05	675.40	14,466,090.047	1,745,942.315	39.832850084	-80.624106661
11,332.00	12.64	124.520	11,248.43	946.19	683.46	14,466,085.182	1,745,950.376	39.832836631	-80.624078023
11,379.00	15.20	126.240	11,294.05	939.63	692.67	14,466,078.624	1,745,959.584	39.832818516	-80.624045322
11,426.00	17.10	125.270	11,339.19	932.00	703.28	14,466,070.991	1,745,970.196	39.832797431	-80.624007636
11,473.00	19.31	124.780	11,383.84	923.57	715.30	14,466,062.568	1,745,982.221	39.832774158	-80.623964926
11,520.00	21.96	124.390	11,427.82	914.18	728.94	14,466,053.169	1,745,995.858	39.832748192	-80.623916491
11,568.00	24.88	123.020	11,471.86	903.60	744.82	14,466,042.595	1,746,011.734	39.832718970	-80.623860098
11,615.00	27.84	123.640	11,513.97	892.13	762.25	14,466,031.126	1,746,029.165	39.832687270	-80.623798182
11,660.00	30.67	124.610	11,553.23	879.79	780.45	14,466,018.783	1,746,047.363	39.832653165	-80.623733546
11,707.00	33.05	126.500	11,593.14	865.36	800.62	14,466,004.349	1,746,067.535	39.832613292	-80.623661910
11,753.00	35.84	127.210	11,631.07	849.75	821.43	14,465,988.741	1,746,088.347	39.832570188	-80.623588008
11,800.00	39.20	129.850	11,668.35	831.90	843.80	14,465,970.896	1,746,110.717	39.832520924	-80.623508596
11,846.00	42.47	128.400	11,703.15	812.94	867.14	14,465,951.929	1,746,134.054	39.832468568	-80.623425752
11,893.00	45.74	129.760	11,736.89	792.31	892.52	14,465,931.303	1,746,159.435	39.832411631	-80.623335656
11,940.00	49.01	131.440	11,768.72	769.80	918.76	14,465,908.792	1,746,185.678	39.832349507	-80.623242514
11,987.00	51.92	134.480	11,798.64	745.09	945.27	14,465,884.083	1,746,212.183	39.832281343	-80.623148474
12,034.00	54.93	136.550	11,826.64	718.16	971.70	14,465,857.151	1,746,238.617	39.832207077	-80.623054722
12,081.00	58.11	138.890	11,852.57	689.15	998.06	14,465,828.144	1,746,264.973	39.832127113	-80.622961278
12,128.00	61.03	142.150	11,876.38	657.87	1,023.80	14,465,796.863	1,746,290.718	39.832040911	-80.622870043
12,175.00	64.52	144.260	11,897.88	624.40	1,048.82	14,465,763.397	1,746,315.734	39.831948715	-80.622778137
12,222.00	68.27	145.630	11,916.69	589.15	1,073.54	14,465,728.145	1,746,340.459	39.831851619	-80.622693897
12,269.00	71.68	147.390	11,932.79	552.33	1,097.90	14,465,691.321	1,746,364.815	39.831750210	-80.622607697
12,317.00	75.12	147.960	11,946.50	513.46	1,122.49	14,465,652.455	1,746,389.406	39.831643191	-80.622520688
12,364.00	78.44	149.290	11,957.24	474.40	1,146.30	14,465,613.395	1,746,413.220	39.831535649	-80.622436449
12,411.00	82.02	149.240	11,965.22	434.60	1,169.97	14,465,573.589	1,746,436.888	39.831426060	-80.622352743
12,458.00	85.77	149.200	11,970.22	394.45	1,193.88	14,465,533.446	1,746,460.800	39.831315540	-80.622268176
12,505.00	89.53	149.240	11,972.14	354.11	1,217.91	14,465,493.108	1,746,484.827	39.831204484	-80.622183198
12,599.00	89.48	151.450	11,972.96	272.43	1,264.42	14,465,411.428	1,746,531.331	39.830979636	-80.622018782
12,693.00	89.00	148.270	11,974.20	191.16	1,311.60	14,465,330.155	1,746,578.519	39.830755894	-80.621851925
12,788.00	88.95	148.050	11,975.90	110.47	1,361.71	14,465,249.463	1,746,628.628	39.830533716	-80.621674656
12,882.00	89.17	147.390	11,977.44	31.01	1,411.91	14,465,170.002	1,746,678.823	39.830314916	-80.621497066
12,976.00	88.82	151.580	11,979.09	-49.94	1,459.62	14,465,089.053	1,746,726.534	39.830092056	-80.621328342
13,071.00	88.73	151.450	11,981.12	-133.42	1,504.92	14,465,005.572	1,746,771.832	39.829862275	-80.621168256
13,165.00	88.60	151.670	11,983.31	-216.06	1,549.67	14,464,922.939	1,746,816.586	39.829634826	-80.621010094
13,260.00	88.82	150.430	11,985.45	-299.16	1,595.64	14,464,839.833	1,746,862.558	39.829400064	-80.620847603
13,354.00	89.31	147.960	11,986.99	-379.88	1,643.77	14,464,759.113	1,746,910.587	39.829163828	-80.620677395
13,447.00	89.04	147.080	11,988.33	-458.33	1,693.71	14,464,680.669	1,746,960.623	39.828967823	-80.620500717
13,541.00	89.22	147.660	11,989.75	-537.48	1,744.39	14,464,601.515	1,747,011.302	39.828749858	-80.620321402
13,633.00	89.26	147.520	11,990.97	-615.14	1,793.69	14,464,523.852	1,747,060.607	39.828536005	-80.620146960
13,727.00	89.97	147.040	11,991.61	-694.23	1,844.50	14,464,444.771	1,747,111.416	39.828318237	-80.619967187
13,820.00	90.01	149.370	11,991.62	-773.26	1,893.50	14,464,365.732	1,747,160.412	39.828100608	-80.619793868
13,913.00	89.62	152.060	11,991.92	-854.37	1,938.98	14,464,284.626	1,747,205.899	39.827877342	-80.619633082
14,006.00	89.66	151.220	11,992.51	-936.21	1,983.16	14,464,202.790	1,747,250.074	39.827652088	-80.619476982
14,100.00	89.66	151.000	11,993.06	-1,018.51	2,028.57	14,464,120.490	1,747,295.487	39.827425544	-80.619316478
14,193.00	89.93	149.680	11,993.40	-1,099.32	2,074.59	14,464,039.678	1,747,341.507	39.827203078	-80.619153792
14,287.00	90.01	148.930	11,993.45	-1,180.15	2,122.58	14,463,958.848	1,747,389.490	39.826980542	-80.618984114
14,379.00	88.82	149.950	11,994.39	-1,259.36	2,169.35	14,463,879.634	1,747,436.263	39.826762455	-80.618818725
14,472.00	88.91	149.810	11,996.23	-1,339.79	2,216.01	14,463,799.207	1,747,482.922	39.826541040	-80.618653759



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,564.00	88.95	149.990	11,997.95	-1,419.37	2,262.14	14,463,719.627	1,747,529.053	39.826321956	-80.618490663
14,657.00	88.91	149.810	11,999.68	-1,499.82	2,308.77	14,463,639.183	1,747,575.685	39.826100491	-80.618325796
14,750.00	89.40	148.580	12,001.05	-1,579.68	2,356.39	14,463,559.314	1,747,623.306	39.825880597	-80.618157400
14,844.00	89.31	149.420	12,002.11	-1,660.25	2,404.80	14,463,478.746	1,747,671.716	39.825658773	-80.617986205
14,938.00	89.26	150.780	12,003.29	-1,741.73	2,451.66	14,463,397.267	1,747,718.569	39.825434463	-80.617820571
15,031.00	89.04	149.290	12,004.67	-1,822.29	2,498.10	14,463,316.709	1,747,765.013	39.825212690	-80.617656379
15,124.00	88.95	149.900	12,006.30	-1,902.49	2,545.16	14,463,236.512	1,747,812.074	39.824991899	-80.617489988
15,218.00	89.40	149.070	12,007.65	-1,983.46	2,592.88	14,463,155.541	1,747,859.798	39.824768975	-80.617321246
15,312.00	89.09	149.680	12,008.89	-2,064.34	2,640.77	14,463,074.660	1,747,907.679	39.824546295	-80.617151946
15,405.00	88.95	149.240	12,010.48	-2,144.43	2,688.02	14,462,994.574	1,747,954.929	39.824325805	-80.616984882
15,498.00	88.82	150.300	12,012.29	-2,224.76	2,734.83	14,462,914.237	1,748,001.742	39.824104633	-80.616819378
15,591.00	88.95	149.370	12,014.10	-2,305.15	2,781.55	14,462,833.847	1,748,048.464	39.823883316	-80.616654200
15,684.00	89.00	149.420	12,015.76	-2,385.18	2,828.89	14,462,753.815	1,748,095.804	39.823662974	-80.616486817
15,777.00	89.00	149.110	12,017.39	-2,465.11	2,876.41	14,462,673.891	1,748,143.326	39.823442923	-80.616318785
15,870.00	88.78	149.510	12,019.19	-2,545.07	2,923.87	14,462,593.931	1,748,190.784	39.823222779	-80.616150986
15,962.00	88.47	149.860	12,021.39	-2,624.47	2,970.29	14,462,514.534	1,748,237.207	39.823004191	-80.615986860
16,056.00	88.69	149.460	12,023.72	-2,705.57	3,017.76	14,462,433.434	1,748,284.675	39.822780911	-80.615819044
16,149.00	88.47	149.810	12,026.03	-2,785.78	3,064.76	14,462,353.216	1,748,331.672	39.822560062	-80.615652889
16,242.00	88.69	149.420	12,028.33	-2,865.99	3,111.79	14,462,273.015	1,748,378.698	39.822339257	-80.615486636
16,335.00	88.51	151.220	12,030.61	-2,946.76	3,157.82	14,462,192.244	1,748,424.732	39.822116899	-80.615323924
16,429.00	88.56	149.200	12,033.01	-3,028.30	3,204.50	14,462,110.697	1,748,471.415	39.821892402	-80.615158911
16,522.00	88.86	148.710	12,035.10	-3,107.96	3,252.45	14,462,031.039	1,748,519.364	39.821673077	-80.614989364
16,614.00	88.60	150.960	12,037.14	-3,187.48	3,298.67	14,461,951.522	1,748,565.579	39.821454161	-80.614825991
16,708.00	88.82	148.890	12,039.26	-3,268.80	3,345.76	14,461,870.203	1,748,612.671	39.821230283	-80.614659524
16,801.00	88.73	149.070	12,041.25	-3,348.48	3,393.67	14,461,790.521	1,748,660.586	39.821010894	-80.614490100
16,894.00	88.51	149.640	12,043.49	-3,428.47	3,441.06	14,461,710.533	1,748,707.976	39.820790668	-80.614322553
16,988.00	88.78	150.560	12,045.71	-3,509.93	3,487.91	14,461,629.069	1,748,754.820	39.820566395	-80.614156974
17,081.00	88.86	150.920	12,047.63	-3,591.05	3,533.35	14,461,547.952	1,748,800.266	39.820343092	-80.613996369
17,174.00	88.91	151.270	12,049.43	-3,672.45	3,578.30	14,461,466.554	1,748,845.210	39.820119022	-80.613837558
17,267.00	89.00	151.000	12,051.13	-3,753.88	3,623.19	14,461,385.122	1,748,890.097	39.819894860	-80.613678948
17,361.00	88.91	149.680	12,052.85	-3,835.55	3,669.69	14,461,303.453	1,748,936.605	39.819670030	-80.613514575
17,453.00	88.69	149.730	12,054.77	-3,914.97	3,716.09	14,461,224.035	1,748,983.004	39.819451378	-80.613350554
17,546.00	88.82	149.240	12,056.79	-3,995.07	3,763.30	14,461,143.935	1,749,030.215	39.819230846	-80.613183654
17,639.00	89.00	149.510	12,058.56	-4,075.08	3,810.67	14,461,063.921	1,749,077.582	39.819010549	-80.613016197
17,732.00	89.22	148.230	12,060.01	-4,154.68	3,858.74	14,460,984.325	1,749,125.654	39.818791389	-80.612846223
17,826.00	89.00	149.070	12,061.47	-4,234.94	3,907.64	14,460,904.059	1,749,174.553	39.818570381	-80.612673318
17,919.00	88.95	151.000	12,063.13	-4,315.50	3,954.08	14,460,823.507	1,749,220.994	39.818348615	-80.612509170
18,013.00	89.04	149.370	12,064.78	-4,397.04	4,000.81	14,460,741.965	1,749,267.722	39.818124127	-80.612344017
18,106.00	88.91	149.730	12,066.44	-4,477.20	4,047.93	14,460,661.805	1,749,314.845	39.817903431	-80.612177435
18,200.00	88.82	148.980	12,068.30	-4,558.05	4,095.84	14,460,580.950	1,749,362.749	39.817680813	-80.612008087
18,293.00	88.95	149.070	12,070.11	-4,637.78	4,143.69	14,460,501.228	1,749,410.603	39.817461309	-80.611838897
18,387.00	88.95	148.800	12,071.84	-4,718.28	4,192.19	14,460,420.723	1,749,459.100	39.817239647	-80.611667433
18,480.00	89.04	148.620	12,073.47	-4,797.74	4,240.48	14,460,341.262	1,749,507.394	39.817020855	-80.611496677
18,574.00	88.82	149.290	12,075.22	-4,878.26	4,288.95	14,460,260.741	1,749,555.862	39.816799149	-80.611325318
18,667.00	89.09	150.080	12,076.92	-4,958.53	4,335.89	14,460,180.472	1,749,602.795	39.816578352	-80.611159420
18,760.00	88.95	148.850	12,078.51	-5,038.62	4,383.13	14,460,100.383	1,749,650.038	39.816357646	-80.610992422
18,854.00	89.04	148.400	12,080.16	-5,118.87	4,432.06	14,460,020.140	1,749,698.970	39.816136998	-80.610819409
18,947.00	88.60	149.680	12,082.07	-5,198.60	4,479.89	14,459,940.409	1,749,746.801	39.815917168	-80.610650308
19,040.00	88.42	150.170	12,084.49	-5,279.05	4,526.48	14,459,859.957	1,749,793.391	39.815695673	-80.610485644
19,133.00	88.51	149.510	12,086.98	-5,359.43	4,573.19	14,459,779.577	1,749,840.098	39.815474372	-80.610320558
19,226.00	88.78	149.290	12,089.18	-5,439.46	4,620.52	14,459,699.550	1,749,887.426	39.815253036	-80.610159260
19,320.00	88.47	150.170	12,091.44	-5,520.62	4,667.89	14,459,618.391	1,749,934.795	39.815030587	-80.609985834
19,413.00	89.00	149.290	12,093.49	-5,600.92	4,714.75	14,459,538.091	1,749,981.662	39.814809506	-80.609820183
19,506.00	88.64	150.870	12,095.41	-5,681.50	4,761.13	14,459,457.506	1,750,028.038	39.814587646	-80.609656285

RECEIVED
Office of Oil and Gas
Environmental Protection
2022



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
19,599.00	88.86	150.560	12,097.44	-5,762.60	4,806.61	14,459,376.411	1,750,073.518	39.814364397	-80.609495586	
19,691.00	88.51	151.220	12,099.55	-5,842.95	4,851.35	14,459,296.054	1,750,118.263	39.814143182	-80.609337496	
19,785.00	88.82	150.610	12,101.74	-5,925.08	4,897.04	14,459,213.931	1,750,163.944	39.813917105	-80.609176100	
19,878.00	88.78	152.330	12,103.69	-6,006.76	4,941.44	14,459,132.245	1,750,208.351	39.813692246	-80.609019235	
19,971.00	89.40	151.050	12,105.16	-6,088.63	4,985.54	14,459,050.381	1,750,252.449	39.813466900	-80.608863475	
20,064.00	89.13	148.800	12,106.36	-6,169.09	5,032.14	14,458,969.913	1,750,299.047	39.813245360	-80.608698790	
20,158.00	88.91	147.300	12,107.96	-6,248.84	5,081.87	14,458,890.168	1,750,348.781	39.813025763	-80.608522929	
20,251.00	88.64	147.440	12,109.95	-6,327.14	5,132.01	14,458,811.864	1,750,398.916	39.812810121	-80.608345619	
20,344.00	88.95	148.400	12,111.91	-6,405.93	5,181.39	14,458,733.083	1,750,448.297	39.812593178	-80.608171002	
20,438.00	88.91	151.310	12,113.66	-6,487.19	5,228.58	14,458,651.819	1,750,495.490	39.812369441	-80.608004219	
20,531.00	89.26	148.710	12,115.15	-6,567.72	5,275.06	14,458,571.288	1,750,541.965	39.812147727	-80.607839976	
20,624.00	89.40	148.100	12,116.24	-6,646.93	5,323.78	14,458,492.079	1,750,590.686	39.811929615	-80.607667722	
20,717.00	89.09	149.150	12,117.46	-6,726.32	5,372.19	14,458,412.686	1,750,639.100	39.811711002	-80.607496562	
20,811.00	89.26	148.980	12,118.81	-6,806.94	5,420.51	14,458,332.066	1,750,687.417	39.811489019	-80.607325768	
20,904.00	89.40	150.210	12,119.90	-6,887.15	5,467.57	14,458,251.864	1,750,734.481	39.811268198	-80.607159431	
20,998.00	89.00	150.080	12,121.21	-6,968.66	5,514.36	14,458,170.347	1,750,781.270	39.811043771	-80.606994094	
21,091.00	89.35	148.980	12,122.55	-7,048.81	5,561.52	14,458,090.200	1,750,828.423	39.810823103	-80.606827440	
21,184.00	89.13	148.450	12,123.79	-7,128.28	5,609.81	14,458,010.731	1,750,876.713	39.810604279	-80.606656729	
21,278.00	89.01	150.390	12,125.31	-7,209.19	5,657.62	14,457,929.819	1,750,924.526	39.810381500	-80.606487739	
21,372.00	88.35	150.210	12,127.48	-7,290.82	5,704.18	14,457,848.190	1,750,971.086	39.810156767	-80.606323223	
21,465.00	89.76	150.910	12,129.01	-7,371.80	5,749.88	14,457,767.212	1,751,016.789	39.809933833	-80.606161751	
21,559.00	89.05	148.540	12,129.99	-7,452.97	5,797.27	14,457,686.043	1,751,064.173	39.809710352	-80.605994298	
21,653.00	89.01	151.000	12,131.58	-7,534.17	5,844.58	14,457,604.844	1,751,111.489	39.809486790	-80.605827087	
21,746.00	88.26	152.500	12,133.80	-7,616.06	5,888.59	14,457,522.948	1,751,155.494	39.809261352	-80.605671679	
21,839.00	88.22	153.290	12,136.65	-7,698.81	5,930.94	14,457,440.202	1,751,197.846	39.809033600	-80.605522169	
21,932.00	88.26	152.410	12,139.51	-7,781.52	5,973.36	14,457,357.489	1,751,240.263	39.808805939	-80.605372428	
22,025.00	88.31	151.000	12,142.29	-7,863.37	6,017.42	14,457,275.640	1,751,284.326	39.808580629	-80.605216818	
22,118.00	88.13	149.160	12,145.18	-7,943.93	6,063.78	14,457,195.077	1,751,330.688	39.808358824	-80.605052997	
22,211.00	90.20	148.010	12,146.54	-8,023.29	6,112.25	14,457,115.724	1,751,379.155	39.808140316	-80.604881668	
22,303.00	90.11	148.100	12,146.29	-8,101.35	6,160.93	14,457,037.657	1,751,427.832	39.807925337	-80.604709568	
22,397.00	89.41	148.720	12,146.68	-8,181.42	6,210.17	14,456,957.588	1,751,477.072	39.807704852	-80.604535498	
22,490.00	90.07	148.010	12,147.10	-8,260.60	6,258.94	14,456,878.409	1,751,525.850	39.807486817	-80.604363060	
22,584.00	89.54	148.360	12,147.42	-8,340.48	6,308.50	14,456,798.533	1,751,575.404	39.807266859	-80.604187870	
22,677.00	89.85	147.660	12,147.92	-8,419.35	6,357.77	14,456,719.658	1,751,624.671	39.807049652	-80.604013685	
22,770.00	89.63	148.100	12,148.34	-8,498.12	6,407.21	14,456,640.894	1,751,674.118	39.806832748	-80.603838862	
22,863.00	88.92	148.010	12,149.52	-8,577.03	6,456.42	14,456,561.985	1,751,723.320	39.806615449	-80.603664912	
22,957.00	90.51	148.980	12,149.98	-8,657.17	6,505.53	14,456,481.846	1,751,772.439	39.806394772	-80.603491280	
23,050.00	90.07	148.540	12,149.51	-8,736.68	6,553.77	14,456,402.332	1,751,820.670	39.806175823	-80.603320800	
23,143.00	90.24	148.800	12,149.26	-8,816.12	6,602.12	14,456,322.894	1,751,869.027	39.805957077	-80.603149874	
Survey @ 23143.00 MD 12149.26 TVD										
23,199.00	90.24	148.800	12,149.03	-8,864.02	6,631.13	14,456,274.994	1,751,898.036	39.805825181	-80.603047339	
Survey proj. to 23199.00 MD 12149.03 TVD										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Comment	
182.50	182.50	0.14	-0.10	MWD surveys	
23,143.00	12,149.26	-8,816.12	6,602.12	Survey @ 23143.00 MD 12149.26 TVD	
23,199.00	12,149.03	-8,864.02	6,631.13	Survey proj. to 23199.00 MD 12149.03 TVD	

39.805825181 -80.603047339

RECEIVED
Office of Oil and Gas
JAN 28 2024
WV Department of
Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-21 HU (slot U)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-21 HU (slot U)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Nov1522LT

RECEIVED
Office of Oil and Gas
JAN 29 2024
WV Department of
Environmental Protection