



Well: Breckenridge S-20 HU (slot T)
 Site: Breckenridge (1 row)
 Project: Marshall County, West Virginia NAD83 UTM 17N
 Design: rev15
 Rig: Nabors X14

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Annotation
1	15598.00	89.09	150.780	12006.11	-2610.84	1613.08	0.00	0.00	3068.01	S/T Begin 2"/100' drop/turn (135L)
2	15688.00	87.82	149.506	12008.54	-2688.86	1657.87	2.00	-135.00	3157.97	Begin 2"/100' turn (90L)
3	15748.00	87.82	148.306	12010.82	-2740.20	1688.83	2.00	-90.00	3217.92	Begin 2"/100' build
4	15813.84	89.10	148.606	12012.59	-2796.29	1723.26	2.00	13.19	3283.72	Begin 89.10° lateral
5	16613.84	89.10	148.606	12025.16	-3479.09	2139.95	0.00	0.00	4083.47	Begin 2"/100' turn
6	16806.68	89.10	152.463	12028.18	-3646.93	2234.77	2.00	89.99	4276.23	Begin 89.10° lateral
7	17298.75	89.10	152.463	12035.89	-4083.21	2462.24	0.00	0.00	4767.68	Begin 2"/100' turn
8	17410.20	89.10	150.234	12037.64	-4180.99	2515.67	2.00	-90.08	4879.06	Begin 89.10° lateral
9	24410.20	89.10	150.234	12147.59	-10256.66	5990.45	0.00	0.00	1877.91	PBHL/TD 24410.20 MD 12147.59 TVD

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
Breckenridge S-20HU BHL r15 12147.59	-10256.66	5990.45	1751245.669	39.802016000	-80.605392000		

MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Annotation
214.50	0.18	144.480	214.50	-0.27	0.20	0.34	MWD surveys
12224.00	1.14	159.000	12130.10	764.87	-313.76	-818.72	Survey @ 12224.00 MD 12130.10 TVD
12286.00	1.14	159.000	12192.09	763.72	-313.32	-817.51	Survey Proj. to 12286.00 MD 12192.09 TVD

ANNOTATIONS SURVEYS ORIGINAL HOLE

MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Annotation
11054.00	1.49	328.980	10960.49	788.15	-320.88	-842.41	Tie into original hole @ 11054 MD
16533.00	89.26	148.450	12019.69	-3423.54	2074.83	4002.66	Survey @ 16533.00 MD 12019.69 TVD
16646.00	89.26	148.450	12021.15	-3519.83	2133.95	4115.62	Survey Proj. to 16646.00 MD 12021.15 TVD

ANNOTATIONS SURVEYS SIDETRACK 02

MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Annotation
15506.00	89.09	150.560	12004.65	-2530.64	1568.02	2976.04	Tie into sidetrack 01 @ 15506 MD
24359.00	88.70	149.330	12214.29	-10207.60	5960.12	11820.24	Survey @ 24359.00 MD 12214.29 TVD
24416.00	88.70	149.330	12215.58	-10256.62	5989.18	11877.23	Survey Proj. to 24416.00 MD 12215.58 TVD

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

System Datum: Mean Sea Level
 Depth Reference: RKB=1370+32.5 @ 1402.50ft (Nabors X14)

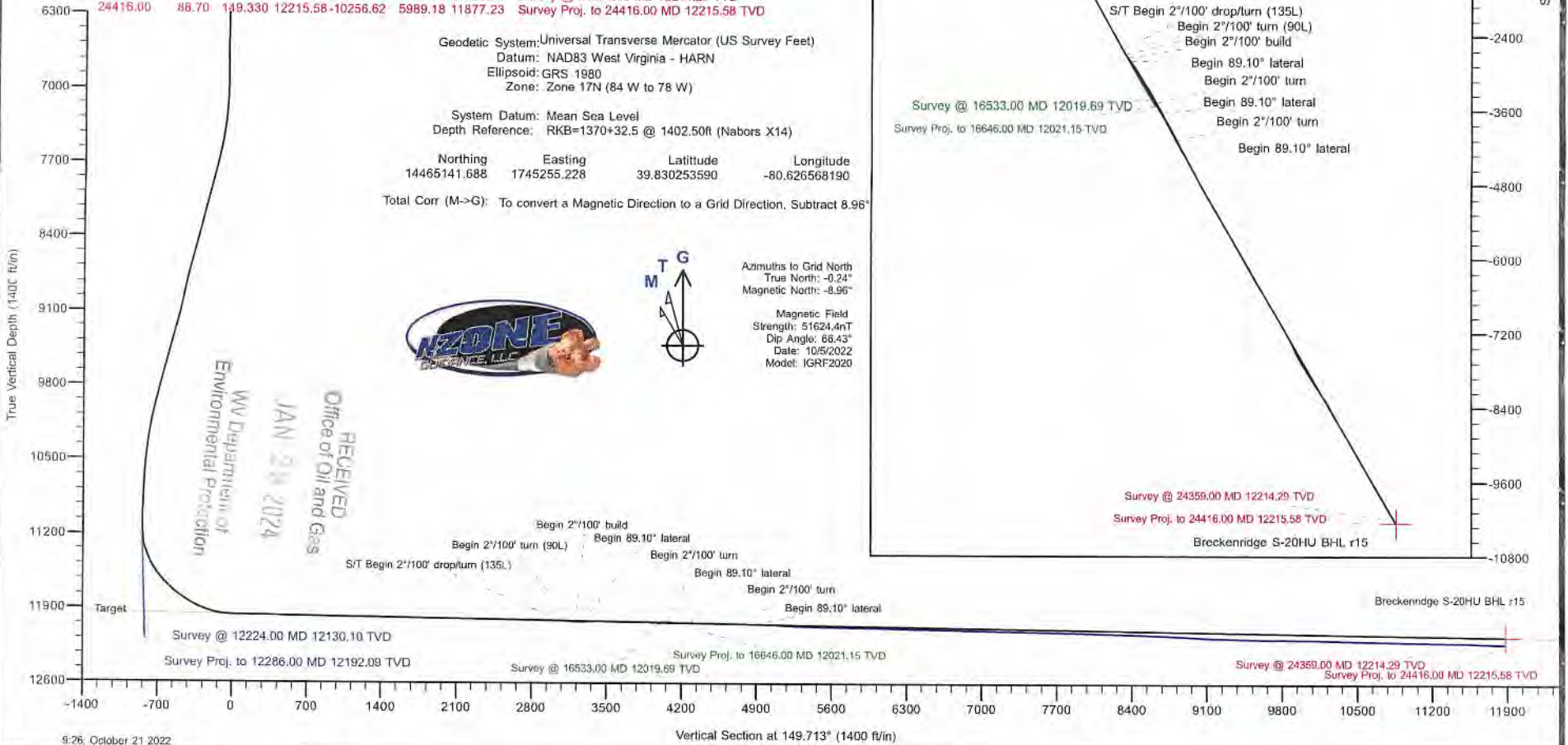
Northing	Easting	Latitude	Longitude
14465141.688	1745255.228	39.830253590	-80.626568190

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.96°



Azimuths to Grid North
 True North: -0.24°
 Magnetic North: -8.96°

Magnetic Field
 Strength: 51624.4nT
 Dip Angle: 66.43°
 Date: 10/5/2022
 Model: IGRF2020



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Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

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-20 HU (slot T)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,141.688 usft	Latitude:	39.830253590
	+E/-W	0.00 ft	Easting:	1,745,255.228 usft	Longitude:	-80.626568190
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	1/20/2022	-8.72	66.50	51,697.89379846

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	149.718	

Survey Program	Date 10/5/2022			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
214.50	1,163.50	MWD surf (Original Hole)	MWD	MWD - Standard
1,211.50	2,993.50	MWD int (Original Hole)	MWD	MWD - Standard
3,045.50	5,859.50	MWD 3045.5-5859.5 MD (Original Hole)	MWD	MWD - Standard
5,900.00	10,845.00	MWD int2 (Original Hole)	MWD	MWD - Standard
10,961.00	12,224.00	MWD (Original Hole)	MWD	MWD - Standard
12,286.00	12,286.00	Projection (Original Hole)	MWD	MWD - Standard

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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	
214.50	0.18	144.480	214.50	-0.27	0.20	0.34	0.08	0.08	0.00	
MWD surveys										
245.50	0.11	42.990	245.50	-0.29	0.24	0.38	0.74	-0.23	-327.39	
273.50	0.17	46.490	273.50	-0.24	0.29	0.36	0.22	0.21	12.50	
302.50	0.15	48.000	302.50	-0.19	0.35	0.34	0.07	-0.07	5.21	



Survey Report



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Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

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)
330.50	0.17	23.310	330.50	-0.13	0.40	0.31	0.25	0.07	-88.18
362.50	0.21	324.750	362.50	-0.03	0.38	0.22	0.59	0.13	-183.00
394.50	0.26	8.330	394.50	0.09	0.36	0.11	0.56	0.16	136.19
424.50	0.30	349.160	424.50	0.23	0.35	-0.02	0.34	0.13	-63.90
456.50	0.12	123.870	456.50	0.29	0.36	-0.07	1.23	-0.56	420.97
488.50	0.23	357.560	488.50	0.34	0.39	-0.10	0.99	0.34	-394.72
520.50	0.34	326.270	520.50	0.48	0.33	-0.25	0.58	0.34	-97.78
551.50	0.34	33.400	551.50	0.64	0.33	-0.38	1.21	0.00	216.55
583.50	0.54	12.590	583.50	0.86	0.42	-0.53	0.79	0.63	-65.03
615.50	0.62	357.490	615.49	1.18	0.44	-0.80	0.54	0.25	-47.19
647.50	0.74	338.480	647.49	1.55	0.36	-1.15	0.79	0.38	-59.41
678.50	0.67	358.780	678.49	1.91	0.28	-1.51	0.83	-0.23	65.48
710.50	1.01	347.910	710.49	2.38	0.22	-1.94	1.17	1.06	-33.97
742.50	0.93	2.950	742.48	2.91	0.17	-2.43	0.83	-0.25	47.00
773.50	1.44	355.180	773.48	3.55	0.16	-2.99	1.72	1.65	-25.06
805.50	0.79	6.060	805.47	4.17	0.14	-3.53	2.13	-2.03	34.00
837.50	0.60	7.450	837.47	4.56	0.19	-3.84	0.60	-0.59	4.34
869.50	0.12	329.430	869.47	4.75	0.19	-4.01	1.60	-1.50	-118.81
901.50	0.19	37.620	901.47	4.82	0.21	-4.06	0.57	0.22	213.09
932.50	0.17	36.980	932.47	4.90	0.27	-4.10	0.06	-0.06	-2.06
964.50	0.22	7.580	964.47	5.00	0.31	-4.16	0.34	0.16	-91.88
996.50	0.41	25.830	996.47	5.16	0.36	-4.28	0.66	0.59	57.03
1,059.50	0.64	6.830	1,059.46	5.72	0.50	-4.68	0.45	0.37	-30.16
1,122.50	0.73	8.380	1,122.46	6.46	0.60	-5.28	0.15	0.14	2.46
1,163.50	0.79	31.650	1,163.45	6.96	0.79	-5.61	0.76	0.15	56.76
1,211.50	0.52	33.930	1,211.45	7.42	1.09	-5.86	0.57	-0.56	4.75
1,243.50	0.62	21.970	1,243.45	7.70	1.23	-6.03	0.48	0.31	-37.38
1,274.50	0.74	25.790	1,274.45	8.04	1.38	-6.25	0.41	0.39	12.32
1,306.50	1.01	35.520	1,306.44	8.46	1.63	-6.48	0.96	0.84	30.41
1,337.50	1.10	39.950	1,337.44	8.91	1.98	-6.69	0.39	0.29	14.29
1,369.50	1.36	40.050	1,369.43	9.43	2.43	-6.92	0.81	0.81	0.31
1,401.50	1.53	36.310	1,401.42	10.07	2.92	-7.22	0.61	0.53	-11.69
1,432.50	1.39	43.730	1,432.41	10.67	3.43	-7.49	0.76	-0.45	23.94
1,464.50	1.28	48.980	1,464.40	11.19	3.97	-7.66	0.51	-0.34	16.41
1,495.50	1.15	39.980	1,495.40	11.65	4.43	-7.83	0.74	-0.42	-29.03
1,527.50	0.89	48.800	1,527.39	12.06	4.82	-7.99	0.95	0.81	0.31
1,558.50	0.60	65.620	1,558.39	12.29	5.15	-8.02	1.16	-0.94	54.26
1,590.50	0.31	113.070	1,590.39	12.32	5.38	-7.93	1.41	-0.91	148.28
1,622.50	0.43	151.830	1,622.39	12.18	5.52	-7.74	0.84	0.38	121.13
1,654.50	0.38	155.370	1,654.39	11.98	5.62	-7.51	0.17	0.16	10.06
1,686.50	0.39	194.190	1,686.38	11.78	5.64	-7.33	0.80	0.03	121.31
1,717.50	0.31	213.680	1,717.38	11.61	5.56	-7.22	0.46	-0.26	62.87
1,749.50	0.24	248.360	1,749.38	11.51	5.45	-7.19	0.55	-0.22	108.38

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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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

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)
1,780.50	0.28	269.990	1,780.38	11.49	5.32	-7.24	0.34	0.13	69.77
1,812.50	0.36	280.910	1,812.38	11.51	5.14	-7.34	0.31	0.25	34.13
1,843.50	0.51	291.250	1,843.38	11.57	4.92	-7.52	0.54	0.48	33.35
1,875.50	0.62	283.160	1,875.38	11.67	4.62	-7.75	0.42	0.34	-25.28
1,907.50	0.81	284.580	1,907.38	11.76	4.23	-8.02	0.60	0.59	4.44
1,939.50	0.98	280.910	1,939.37	11.87	3.74	-8.36	0.56	0.53	-11.47
1,970.50	0.89	262.320	1,970.37	11.89	3.24	-8.63	1.02	-0.29	-59.97
2,001.50	1.10	239.570	2,001.37	11.71	2.75	-8.72	1.43	0.68	-73.39
2,033.50	1.50	223.000	2,033.36	11.24	2.20	-8.60	1.70	1.25	-51.78
2,064.50	1.50	215.090	2,064.35	10.61	1.69	-8.32	0.67	0.00	-25.52
2,096.50	1.52	209.520	2,096.34	9.90	1.24	-7.93	0.46	0.06	-17.41
2,128.50	1.03	203.490	2,128.33	9.27	0.91	-7.54	1.59	-1.53	-18.84
2,159.50	1.07	180.260	2,159.32	8.72	0.80	-7.13	1.37	0.13	-74.94
2,191.50	0.93	173.210	2,191.32	8.17	0.83	-6.64	0.58	-0.44	-22.03
2,222.50	0.97	162.010	2,222.31	7.67	0.94	-6.15	0.61	0.13	-36.13
2,254.50	1.09	150.510	2,254.31	7.15	1.17	-5.58	0.75	0.38	-35.94
2,286.50	1.22	146.800	2,286.30	6.60	1.51	-4.93	0.47	0.41	-11.59
2,317.50	1.20	146.030	2,317.30	6.05	1.87	-4.28	0.08	-0.06	-2.48
2,349.50	1.21	134.630	2,349.29	5.54	2.30	-3.62	0.75	0.03	-35.63
2,381.50	1.08	143.300	2,381.28	5.06	2.72	-2.99	0.68	-0.41	27.09
2,413.50	1.22	123.810	2,413.28	4.63	3.18	-2.39	1.29	0.44	-60.91
2,444.50	1.03	131.480	2,444.27	4.26	3.67	-1.83	0.78	-0.61	24.74
2,476.50	0.92	122.970	2,476.26	3.93	4.10	-1.32	0.57	-0.34	-26.59
2,507.50	0.75	129.890	2,507.26	3.66	4.46	-0.91	0.64	-0.55	22.32
2,539.50	0.68	122.750	2,539.26	3.42	4.78	-0.55	0.35	-0.22	-22.31
2,571.50	0.48	131.890	2,571.26	3.23	5.04	-0.25	0.69	-0.63	28.56
2,602.50	0.17	170.870	2,602.26	3.10	5.15	-0.08	1.17	-1.00	125.74
2,634.50	0.15	190.710	2,634.26	3.01	5.15	-0.01	0.18	-0.06	62.00
2,665.50	0.29	274.630	2,665.26	2.98	5.06	-0.02	1.01	0.45	270.71
2,697.50	0.44	312.420	2,697.26	3.07	4.89	-0.18	0.86	0.47	118.09
2,729.50	0.57	312.980	2,729.25	3.26	4.68	-0.45	0.41	0.41	1.75
2,759.50	0.53	311.700	2,759.25	3.45	4.47	-0.73	0.14	-0.13	-4.27
2,791.50	0.80	311.720	2,791.25	3.70	4.19	-1.08	0.84	0.84	0.06
2,823.50	0.85	332.480	2,823.25	4.06	3.91	-1.53	0.94	0.16	64.88
2,855.50	0.91	335.690	2,855.24	4.50	3.70	-2.02	0.24	0.19	10.03
2,886.50	0.97	338.030	2,886.24	4.97	3.50	-2.53	0.23	0.19	7.55
2,918.50	1.05	340.100	2,918.23	5.50	3.30	-3.08	0.27	0.25	6.47
2,950.50	1.17	340.140	2,950.23	6.08	3.09	-3.69	0.38	0.38	0.13
2,993.50	1.58	348.010	2,993.22	7.07	2.82	-4.69	1.05	0.95	18.30
3,045.50	1.89	345.820	3,045.19	8.60	2.46	-6.19	0.61	0.60	-4.21
3,077.50	2.08	352.290	3,077.17	9.69	2.25	-7.23	0.92	0.59	20.22
3,109.50	1.85	355.260	3,109.15	10.78	2.13	-8.24	0.79	-0.72	9.28
3,141.50	1.09	357.630	3,141.14	11.60	2.07	-8.97	2.38	-2.38	7.41



Survey Report



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3,172.50	0.23	350.750	3,172.14	11.96	2.05	-9.29	2.78	-2.77	-22.19
3,204.50	0.32	179.780	3,204.14	11.93	2.04	-9.27	1.71	0.28	-534.28
3,236.50	0.63	182.360	3,236.14	11.67	2.04	-9.05	0.97	0.97	8.06
3,268.50	0.88	185.620	3,268.14	11.25	2.00	-8.70	0.79	0.78	10.19
3,300.50	1.04	192.190	3,300.13	10.72	1.92	-8.29	0.61	0.50	20.53
3,331.50	1.13	190.980	3,331.13	10.14	1.80	-7.85	0.30	0.29	-3.90
3,363.50	1.23	195.200	3,363.12	9.50	1.65	-7.37	0.41	0.31	13.19
3,394.50	1.28	196.440	3,394.11	8.85	1.47	-6.90	0.18	0.16	4.00
3,426.50	1.25	198.600	3,426.11	8.17	1.25	-6.43	0.18	-0.09	6.75
3,457.50	1.20	198.520	3,457.10	7.55	1.04	-5.99	0.16	-0.16	-0.26
3,489.50	1.22	200.580	3,489.09	6.91	0.82	-5.55	0.15	0.06	6.44
3,521.50	1.14	200.710	3,521.08	6.29	0.58	-5.14	0.25	-0.25	0.41
3,552.50	0.53	213.600	3,552.08	5.88	0.40	-4.88	2.05	-1.97	41.58
3,584.50	0.66	340.960	3,584.08	5.94	0.25	-5.00	3.34	0.41	398.00
3,615.50	1.42	359.750	3,615.07	6.49	0.19	-5.50	2.66	2.45	60.61
3,647.50	1.87	3.430	3,647.06	7.41	0.22	-6.28	1.44	1.41	11.50
3,679.50	2.29	5.610	3,679.04	8.56	0.32	-7.23	1.34	1.31	6.81
3,710.50	2.53	8.030	3,710.01	9.86	0.47	-8.27	0.84	0.77	7.81
3,742.50	2.71	7.900	3,741.98	11.31	0.68	-9.42	0.56	0.56	-0.41
3,773.50	2.79	7.890	3,772.94	12.78	0.88	-10.59	0.26	0.26	-0.03
3,804.50	2.42	11.230	3,803.91	14.17	1.11	-11.67	1.29	-1.19	10.77
3,835.50	1.71	7.580	3,834.89	15.27	1.30	-12.53	2.33	-2.29	-11.77
3,867.50	1.45	5.790	3,866.88	16.14	1.40	-13.23	0.83	-0.81	-5.59
3,899.50	1.38	4.290	3,898.87	16.93	1.47	-13.88	0.25	-0.22	-4.69
3,929.50	1.38	4.050	3,928.86	17.65	1.53	-14.47	0.02	0.00	-0.80
3,961.50	1.39	0.040	3,960.85	18.42	1.55	-15.13	0.30	0.03	-12.53
3,993.50	1.61	359.180	3,992.84	19.26	1.55	-15.85	0.69	0.69	-2.69
4,024.50	1.63	359.260	4,023.83	20.14	1.54	-16.62	0.06	0.06	0.26
4,055.50	1.93	358.010	4,054.81	21.10	1.51	-17.46	0.98	0.97	-4.03
4,087.50	2.42	359.120	4,086.79	22.32	1.48	-18.52	1.54	1.53	3.47
4,119.50	2.90	0.700	4,118.76	23.80	1.48	-19.81	1.52	1.50	4.94
4,150.50	3.28	359.930	4,149.71	25.47	1.49	-21.24	1.23	1.23	-2.48
4,182.50	3.55	1.370	4,181.65	27.38	1.51	-22.88	0.89	0.84	4.50
4,213.50	3.83	0.380	4,212.59	29.37	1.54	-24.59	0.93	0.90	-3.19
4,245.50	3.69	354.860	4,244.52	31.47	1.46	-26.44	1.21	-0.44	-17.25
4,277.50	3.12	349.750	4,276.46	33.35	1.21	-28.19	2.02	-1.78	-15.97
4,308.50	3.01	345.340	4,307.42	34.97	0.85	-29.76	0.84	-0.35	-14.23
4,340.50	3.19	345.700	4,339.37	36.64	0.42	-31.43	0.57	0.56	1.13
4,372.50	3.44	344.280	4,371.32	38.43	-0.06	-33.21	0.82	0.78	-4.44
4,404.50	3.74	347.030	4,403.26	40.37	-0.55	-35.14	1.08	0.94	8.59
4,435.50	3.67	348.160	4,434.19	42.33	-0.98	-37.05	0.33	-0.23	3.65
4,467.50	3.37	352.760	4,466.13	44.26	-1.31	-38.88	1.29	-0.94	14.38
4,498.50	3.22	357.070	4,497.08	46.04	-1.47	-40.50	0.93	-0.48	13.90
4,530.50	3.26	359.980	4,529.03	47.84	-1.52	-42.08	0.53	0.13	9.09



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

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)
4,562.50	3.48	1,430	4,560.97	49.72	-1.49	-43.69	0.74	0.69	4.53
4,594.50	3.78	1,510	4,592.91	51.75	-1.44	-45.41	0.94	0.94	0.25
4,626.50	3.59	4,890	4,624.84	53.80	-1.33	-47.13	0.90	-0.59	10.56
4,658.50	3.01	5,330	4,656.79	55.64	-1.17	-48.63	1.81	-1.81	1.38
4,689.50	2.97	7,670	4,687.75	57.24	-0.98	-49.93	0.41	-0.13	7.55
4,721.50	2.78	10,870	4,719.71	58.83	-0.73	-51.17	0.78	-0.59	10.00
4,753.50	2.15	16,380	4,751.68	60.16	-0.41	-52.16	2.10	-1.97	17.22
4,785.50	1.77	15,560	4,783.66	61.22	-0.11	-52.92	1.19	-1.19	-2.56
4,816.50	1.24	11,610	4,814.65	62.01	0.09	-53.50	1.74	-1.71	-12.74
4,848.50	1.12	7,270	4,846.64	62.66	0.20	-54.01	0.47	-0.38	-13.56
4,879.50	1.18	356,340	4,877.64	63.27	0.22	-54.53	0.73	0.19	-35.26
4,911.50	1.17	356,950	4,909.63	63.93	0.18	-55.12	0.05	-0.03	1.91
4,943.50	0.79	347,870	4,941.62	64.47	0.11	-55.62	1.28	-1.19	-28.38
4,975.50	0.50	323,980	4,973.62	64.80	-0.02	-55.97	1.22	-0.91	-74.66
5,007.50	0.31	292,790	5,005.62	64.95	-0.18	-56.17	0.89	-0.59	-97.47
5,039.50	0.35	271,860	5,037.62	64.98	-0.35	-56.30	0.39	0.13	-65.41
5,070.50	0.44	256,300	5,068.62	64.96	-0.56	-56.38	0.45	0.29	-50.19
5,102.50	0.41	246,630	5,100.62	64.88	-0.79	-56.43	0.24	-0.09	-30.22
5,133.50	0.51	250,410	5,131.62	64.79	-1.02	-56.47	0.34	0.32	12.19
5,165.50	0.64	236,450	5,163.62	64.65	-1.30	-56.48	0.59	0.41	-43.63
5,197.50	0.62	234,560	5,195.61	64.45	-1.59	-56.46	0.09	-0.06	-5.91
5,228.50	0.67	241,610	5,226.61	64.26	-1.89	-56.45	0.30	0.16	22.74
5,260.50	0.72	233,490	5,258.61	64.06	-2.22	-56.43	0.34	0.16	-25.38
5,292.50	0.91	238,670	5,290.61	63.80	-2.60	-56.41	0.64	0.59	16.19
5,323.50	0.98	241,220	5,321.60	63.55	-3.04	-56.41	0.26	0.23	8.23
5,355.50	0.80	236,240	5,353.60	63.29	-3.46	-56.40	0.61	-0.56	-15.56
5,385.50	0.67	237,340	5,383.60	63.08	-3.79	-56.38	0.44	-0.43	3.67
5,417.50	0.49	237,170	5,415.59	62.91	-4.06	-56.37	0.56	-0.56	-0.53
5,449.50	0.15	237,480	5,447.59	62.81	-4.21	-56.36	1.06	-1.06	0.97
5,480.50	0.18	193,630	5,478.59	62.74	-4.25	-56.32	0.41	0.10	-141.45
5,512.50	0.20	222,210	5,510.59	62.65	-4.30	-56.27	0.30	0.06	89.31
5,544.50	0.11	173,810	5,542.59	62.58	-4.34	-56.23	0.47	-0.28	-151.25
5,575.50	0.41	99,140	5,573.59	62.53	-4.22	-56.13	1.28	0.97	-240.87
5,607.50	0.68	96,440	5,605.59	62.49	-3.92	-55.94	0.85	0.84	-8.44
5,638.50	0.74	87,960	5,636.59	62.48	-3.54	-55.74	0.39	0.19	-27.35
5,670.50	1.04	88,250	5,668.59	62.49	-3.04	-55.50	0.94	0.94	0.91
5,701.50	1.15	83,970	5,699.58	62.54	-2.45	-55.24	0.44	0.35	-13.81
5,733.50	1.05	91,950	5,731.57	62.56	-1.84	-54.95	0.57	-0.31	24.94
5,764.50	0.81	95,870	5,762.57	62.53	-1.34	-54.67	0.80	-0.77	12.65
5,796.50	0.76	95,680	5,794.57	62.48	-0.90	-54.41	0.16	-0.16	-0.59
5,827.50	0.81	95,290	5,825.56	62.44	-0.48	-54.16	0.16	0.16	-1.26
5,859.50	0.82	92,340	5,857.56	62.41	-0.03	-53.91	0.13	0.03	-9.22
5,900.00	0.78	88,260	5,898.06	62.41	0.54	-53.62	0.17	-0.10	-10.07



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

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)
5,993.00	1.09	103.030	5,991.04	62.23	2.03	-52.71	0.42	0.33	15.88
6,087.00	1.31	107.900	6,085.02	61.70	3.93	-51.30	0.26	0.23	5.18
6,180.00	0.77	96.060	6,178.01	61.30	5.56	-50.14	0.62	-0.58	-12.73
6,273.00	0.68	69.030	6,271.00	61.44	6.70	-49.68	0.38	-0.10	-29.06
6,367.00	0.25	266.430	6,365.00	61.62	7.01	-49.68	0.98	-0.46	-172.98
6,460.00	0.73	281.310	6,458.00	61.73	6.23	-50.16	0.53	0.52	16.00
6,553.00	1.11	285.130	6,550.98	62.08	4.78	-51.20	0.41	0.41	4.11
6,646.00	0.33	316.660	6,643.98	62.51	3.73	-52.10	0.91	-0.84	33.90
6,739.00	0.15	69.150	6,736.98	62.75	3.66	-52.34	0.44	-0.19	120.96
6,833.00	0.43	75.220	6,830.97	62.88	4.11	-52.23	0.30	0.30	6.46
6,988.00	0.38	81.480	6,985.97	63.10	5.18	-51.88	0.04	-0.03	4.04
7,112.00	2.80	346.790	7,109.92	66.11	4.90	-54.62	2.30	1.95	-76.36
7,204.00	5.10	346.220	7,201.70	72.27	3.41	-60.69	2.50	2.50	-0.62
7,298.00	7.18	344.010	7,295.15	81.98	0.80	-70.39	2.23	2.21	-2.35
7,391.00	9.10	338.030	7,387.21	94.39	-3.56	-83.30	2.25	2.06	-6.43
7,484.00	11.12	332.420	7,478.77	109.16	-10.46	-99.54	2.41	2.17	-6.03
7,671.00	13.24	329.140	7,661.55	143.53	-29.80	-138.97	1.19	1.13	-1.75
7,764.00	13.39	331.270	7,752.05	162.12	-40.44	-160.39	0.55	0.16	2.29
7,857.00	13.57	331.230	7,842.49	181.12	-50.86	-182.06	0.19	0.19	-0.04
8,046.00	14.40	328.920	8,025.88	220.69	-73.67	-227.72	0.53	0.44	-1.22
8,140.00	14.15	332.420	8,116.98	240.88	-85.02	-250.89	0.96	-0.27	3.72
8,233.00	13.82	337.130	8,207.23	261.19	-94.60	-273.26	1.27	-0.35	5.06
8,327.00	14.50	338.130	8,298.37	282.46	-103.35	-296.03	0.77	0.72	1.06
8,420.00	14.66	336.890	8,388.38	304.09	-112.30	-319.22	0.38	0.17	-1.33
8,513.00	15.13	335.930	8,478.25	325.99	-121.87	-342.97	0.57	0.51	-1.03
8,606.00	15.50	334.720	8,567.95	348.31	-132.13	-367.41	0.53	0.40	-1.30
8,700.00	15.31	336.250	8,658.57	371.03	-142.49	-392.25	0.48	-0.20	1.63
8,794.00	14.29	337.690	8,749.45	393.12	-151.89	-416.07	1.15	-1.09	1.53
8,888.00	12.75	337.370	8,840.85	413.43	-160.29	-437.84	1.64	-1.64	-0.34
8,981.00	11.79	341.420	8,931.72	431.91	-167.27	-457.32	1.39	-1.03	4.35
9,075.00	12.73	338.610	9,023.58	450.65	-174.10	-476.96	1.18	1.00	-2.99
9,168.00	13.46	337.160	9,114.16	470.17	-182.04	-497.81	0.86	0.78	-1.56
9,262.00	14.33	337.120	9,205.41	490.97	-190.81	-520.20	0.93	0.93	-0.04
9,354.00	15.88	337.680	9,294.23	513.10	-200.02	-543.95	1.69	1.68	0.61
9,447.00	15.85	336.370	9,383.69	536.51	-209.94	-569.17	0.39	-0.03	-1.41
9,540.00	15.20	337.940	9,473.29	559.44	-219.61	-593.85	0.83	-0.70	1.69
9,634.00	14.84	338.880	9,564.12	581.95	-228.52	-617.77	0.65	-0.60	1.00
9,726.00	14.90	337.380	9,653.08	603.71	-237.26	-640.97	0.50	0.28	-1.63
9,819.00	16.26	337.670	9,742.66	626.79	-246.81	-665.72	1.46	1.46	0.31
9,913.00	15.66	337.630	9,833.04	650.70	-256.63	-691.32	0.64	-0.64	-0.04
10,006.00	14.28	336.170	9,922.88	672.80	-266.05	-715.15	1.54	-1.48	-1.57
10,100.00	13.08	335.480	10,014.21	693.08	-275.14	-737.25	1.29	-1.28	-0.73
10,193.00	11.51	335.770	10,105.08	711.12	-283.32	-756.95	1.69	-1.69	0.31



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

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)
10,286.00	10.16	336.900	10,196.42	727.12	-290.35	-774.32	1.47	-1.45	1.22
10,379.00	9.21	334.960	10,288.09	741.41	-296.71	-789.87	1.08	-1.02	-2.09
10,472.00	7.65	337.770	10,380.08	753.88	-302.21	-803.41	1.73	-1.68	3.02
10,566.00	6.26	335.490	10,473.39	764.34	-306.70	-814.70	1.51	-1.48	-2.43
10,659.00	4.54	329.490	10,565.97	772.12	-310.67	-823.43	1.94	-1.85	-6.45
10,752.00	3.16	326.610	10,658.76	777.44	-313.95	-829.67	1.50	-1.48	-3.10
10,845.00	2.42	325.290	10,751.65	781.19	-316.48	-834.19	0.80	-0.80	-1.42
10,961.00	2.51	328.630	10,867.54	785.37	-319.20	-839.17	0.15	0.08	2.88
11,054.00	1.49	328.980	10,960.49	788.15	-320.88	-842.41	1.10	-1.10	0.38
11,148.00	0.53	255.500	11,054.47	789.09	-321.93	-843.75	1.52	-1.02	-78.17
11,242.00	1.27	178.510	11,148.46	787.94	-322.33	-842.96	1.34	0.79	-81.90
11,343.00	1.19	181.850	11,249.44	785.77	-322.33	-841.09	0.11	-0.08	3.31
11,437.00	0.92	205.050	11,343.43	784.11	-322.68	-839.83	0.53	-0.29	24.68
11,530.00	1.32	154.520	11,436.41	782.47	-322.54	-838.34	1.10	0.43	-54.33
11,623.00	1.05	165.060	11,529.39	780.68	-321.86	-836.45	0.37	-0.29	11.33
11,716.00	2.24	135.440	11,622.35	778.56	-320.36	-833.87	1.53	1.28	-31.85
11,809.00	2.11	134.480	11,715.28	776.06	-317.86	-830.46	0.15	-0.14	-1.03
11,902.00	2.02	158.210	11,808.23	773.34	-316.03	-827.18	0.92	-0.10	25.52
11,996.00	1.67	168.490	11,902.18	770.46	-315.15	-824.25	0.51	-0.37	10.94
12,089.00	1.54	168.750	11,995.14	767.91	-314.63	-821.78	0.14	-0.14	0.28
12,182.00	1.27	161.280	12,088.11	765.71	-314.06	-819.59	0.35	-0.29	-8.03
12,224.00	1.14	159.000	12,130.10	764.87	-313.76	-818.72	0.33	-0.31	-5.43
Survey @ 12224.00 MD 12130.10 TVD									
12,286.00	1.14	159.000	12,192.09	763.72	-313.32	-817.51	0.00	0.00	0.00
Survey Proj. to 12286.00 MD 12192.09 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
214.50	214.50	-0.27	0.20	MWD surveys
12,224.00	12,130.10	764.87	-313.76	Survey @ 12224.00 MD 12130.10 TVD
12,286.00	12,192.09	763.72	-313.32	Survey Proj. to 12286.00 MD 12192.09 TVD



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

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-20 HU (slot T)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,141.688 usft	Latitude:	39.830253590
	+E/-W	0.00 ft	Easting:	1,745,255.228 usft	Longitude:	-80.626568190
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	1/20/2022	-8.72	66.50	51,697.89379846

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	149.718	

Survey Program	Date	10/5/2022			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
214.50	1,163.50	MWD surf (Original Hole)	MWD	MWD - Standard	
1,211.50	2,993.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,045.50	5,859.50	MWD 3045.5-5859.5 MD (Original Hole)	MWD	MWD - Standard	
5,900.00	10,845.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
10,961.00	12,224.00	MWD (Original Hole)	MWD	MWD - Standard	
12,286.00	12,286.00	Projection (Original Hole)	MWD	MWD - Standard	

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	0.000	0.00	- 0.00	0.00	14,465,141.688	1,745,255.228	39.830253590	-80.626568190	
214.50	0.18	144.480	214.50	-0.27	0.20	14,465,141.414	1,745,255.424	39.830252835	-80.626567497	
MWD surveys										
245.50	0.11	42.990	245.50	-0.29	0.24	14,465,141.396	1,745,255.473	39.830252786	-80.626567324	
273.50	0.17	46.490	273.50	-0.24	0.29	14,465,141.444	1,745,255.521	39.830252917	-80.626567151	
302.50	0.15	48.000	302.50	-0.19	0.35	14,465,141.499	1,745,255.580	39.830253068	-80.626566939	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
330.50	0.17	23.310	330.50	-0.13	0.40	14,465,141.562	1,745,255.624	39.830253240	-80.626566782
362.50	0.21	324.750	362.50	-0.03	0.38	14,465,141.653	1,745,255.609	39.830253491	-80.626566834
394.50	0.26	8.330	394.50	0.09	0.36	14,465,141.773	1,745,255.586	39.830253820	-80.626566916
424.50	0.30	349.160	424.50	0.23	0.35	14,465,141.918	1,745,255.581	39.830254217	-80.626566931
456.50	0.12	123.870	456.50	0.29	0.36	14,465,141.981	1,745,255.593	39.830254391	-80.626566887
488.50	0.23	357.560	488.50	0.34	0.39	14,465,142.027	1,745,255.618	39.830254516	-80.626566797
520.50	0.34	326.270	520.50	0.48	0.33	14,465,142.170	1,745,255.563	39.830254910	-80.626566992
551.50	0.34	33.400	551.50	0.64	0.33	14,465,142.323	1,745,255.562	39.830255331	-80.626566992
583.50	0.54	12.590	583.50	0.86	0.42	14,465,142.550	1,745,255.647	39.830255952	-80.626566885
615.50	0.62	357.490	615.49	1.18	0.44	14,465,142.870	1,745,255.672	39.830261583	-80.626566590
647.50	0.74	338.480	647.49	1.55	0.36	14,465,143.235	1,745,255.589	39.830257834	-80.626566882
678.50	0.67	358.780	678.49	1.91	0.28	14,465,143.602	1,745,255.512	39.830258844	-80.626567152
710.50	1.01	347.910	710.49	2.38	0.22	14,465,144.065	1,745,255.449	39.830260116	-80.626567369
742.50	0.93	2.950	742.48	2.91	0.17	14,465,144.600	1,745,255.403	39.830261586	-80.626567524
773.50	1.44	355.180	773.48	3.55	0.16	14,465,145.240	1,745,255.383	39.830263342	-80.626567585
805.50	0.79	6.060	805.47	4.17	0.14	14,465,145.860	1,745,255.373	39.830265045	-80.626567613
837.50	0.60	7.450	837.47	4.56	0.19	14,465,146.245	1,745,255.418	39.830266103	-80.626567447
869.50	0.12	329.430	869.47	4.75	0.19	14,465,146.440	1,745,255.422	39.830266639	-80.626567428
901.50	0.19	37.620	901.47	4.82	0.21	14,465,146.511	1,745,255.438	39.830266833	-80.626567372
932.50	0.17	36.980	932.47	4.90	0.27	14,465,146.589	1,745,255.497	39.830267045	-80.626567161
964.50	0.22	7.580	964.47	5.00	0.31	14,465,146.687	1,745,255.534	39.830267316	-80.626567029
996.50	0.41	25.830	996.47	5.16	0.36	14,465,146.851	1,745,255.592	39.830267766	-80.626568200
1,059.50	0.64	6.830	1,059.46	5.72	0.50	14,465,147.404	1,745,255.732	39.830269281	-80.626566312
1,122.50	0.73	8.380	1,122.46	6.46	0.60	14,465,148.150	1,745,255.832	39.830271329	-80.626565944
1,163.50	0.79	31.650	1,163.45	6.96	0.79	14,465,148.649	1,745,256.018	39.830272698	-80.626565273
1,211.50	0.52	33.930	1,211.45	7.42	1.09	14,465,149.111	1,745,256.313	39.830273964	-80.626564214
1,243.50	0.62	21.970	1,243.45	7.70	1.23	14,465,149.392	1,745,256.459	39.830274734	-80.626563691
1,274.50	0.74	25.790	1,274.45	8.04	1.38	14,465,149.728	1,745,256.609	39.830275655	-80.626563152
1,306.50	1.01	35.520	1,306.44	8.46	1.63	14,465,150.144	1,745,256.863	39.830276793	-80.626562242
1,337.50	1.10	39.950	1,337.44	8.91	1.98	14,465,150.594	1,745,257.213	39.830278026	-80.626560989
1,369.50	1.36	40.050	1,369.43	9.43	2.43	14,465,151.120	1,745,257.654	39.830279466	-80.626559409
1,401.50	1.53	36.310	1,401.42	10.07	2.92	14,465,151.755	1,745,258.152	39.830281204	-80.626557628
1,432.50	1.39	43.730	1,432.41	10.67	3.43	14,465,152.361	1,745,258.657	39.830282860	-80.626558200
1,464.50	1.28	48.980	1,464.40	11.19	3.97	14,465,152.876	1,745,259.195	39.830284268	-80.626553896
1,495.50	1.15	39.980	1,495.40	11.65	4.43	14,465,153.341	1,745,259.656	39.830285542	-80.626552247
1,527.50	0.89	48.800	1,527.39	12.06	4.82	14,465,153.751	1,745,260.049	39.830286663	-80.626550840
1,558.50	0.60	65.620	1,558.39	12.29	5.15	14,465,153.977	1,745,260.378	39.830287278	-80.626549665
1,590.50	0.31	113.070	1,590.39	12.32	5.38	14,465,154.012	1,745,260.610	39.830287372	-80.626548837
1,622.50	0.43	151.830	1,622.39	12.18	5.52	14,465,153.872	1,745,260.747	39.830286987	-80.626548353
1,654.50	0.38	155.370	1,654.39	11.98	5.62	14,465,153.670	1,745,260.847	39.830286430	-80.626547997
1,686.50	0.39	194.190	1,686.38	11.78	5.64	14,465,153.468	1,745,260.865	39.830285875	-80.626547937
1,717.50	0.31	213.680	1,717.38	11.61	5.56	14,465,153.296	1,745,260.793	39.830285404	-80.626548198
1,749.50	0.24	248.360	1,749.38	11.51	5.45	14,465,153.199	1,745,260.682	39.830285139	-80.626548592
1,780.50	0.28	269.990	1,780.38	11.49	5.32	14,465,153.175	1,745,260.546	39.830285075	-80.626549077
1,812.50	0.36	280.910	1,812.38	11.51	5.14	14,465,153.194	1,745,260.369	39.830285129	-80.626549707
1,843.50	0.51	291.250	1,843.38	11.57	4.92	14,465,153.262	1,745,260.145	39.830285320	-80.626550505
1,875.50	0.62	283.160	1,875.38	11.67	4.62	14,465,153.353	1,745,259.844	39.830285573	-80.626551577
1,907.50	0.81	284.580	1,907.38	11.76	4.23	14,465,153.450	1,745,259.456	39.830285842	-80.626552955
1,939.50	0.98	280.910	1,939.37	11.87	3.74	14,465,153.558	1,745,258.969	39.830286146	-80.626554691
1,970.50	0.89	262.320	1,970.37	11.89	3.24	14,465,153.576	1,745,258.470	39.830286201	-80.626556467
2,001.50	1.10	239.570	2,001.37	11.71	2.75	14,465,153.394	1,745,257.975	39.830285705	-80.626558234
2,033.50	1.50	223.000	2,033.36	11.24	2.20	14,465,152.932	1,745,257.424	39.830284443	-80.626560200
2,064.50	1.50	215.090	2,064.35	10.61	1.69	14,465,152.303	1,745,256.914	39.830282722	-80.626562027
2,096.50	1.52	209.520	2,096.34	9.90	1.24	14,465,151.591	1,745,256.464	39.830280772	-80.626563640



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
2,128.50	1.03	203.490	2,128.33	9.27	0.91	14,465,150.958	1,745,256.141	39.830279037	-80.626564803	
2,159.50	1.07	180.260	2,159.32	8.72	0.80	14,465,150.413	1,745,256.028	39.830277541	-80.626565211	
2,191.50	0.93	173.210	2,191.32	8.17	0.83	14,465,149.856	1,745,256.057	39.830276012	-80.626565115	
2,222.50	0.97	162.010	2,222.31	7.67	0.94	14,465,149.357	1,745,256.168	39.830274640	-80.626564728	
2,254.50	1.09	150.510	2,254.31	7.15	1.17	14,465,148.834	1,745,256.402	39.830273202	-80.626563904	
2,286.50	1.22	146.800	2,286.30	6.60	1.51	14,465,148.284	1,745,256.738	39.830271688	-80.626562714	
2,317.50	1.20	146.030	2,317.30	6.05	1.87	14,465,147.739	1,745,257.100	39.830270186	-80.626561433	
2,349.50	1.21	134.630	2,349.29	5.54	2.30	14,465,147.224	1,745,257.528	39.830268766	-80.626559917	
2,381.50	1.08	143.300	2,381.28	5.06	2.72	14,465,146.745	1,745,257.949	39.830267445	-80.626558426	
2,413.50	1.22	123.810	2,413.28	4.63	3.18	14,465,146.313	1,745,258.412	39.830266256	-80.626556782	
2,444.50	1.03	131.480	2,444.27	4.26	3.67	14,465,145.945	1,745,258.895	39.830265239	-80.626555067	
2,476.50	0.92	122.970	2,476.26	3.93	4.10	14,465,145.615	1,745,259.326	39.830264327	-80.626553537	
2,507.50	0.75	129.890	2,507.26	3.66	4.46	14,465,145.349	1,745,259.690	39.830263593	-80.626552243	
2,539.50	0.68	122.750	2,539.26	3.42	4.78	14,465,145.112	1,745,260.011	39.830262939	-80.626551105	
2,571.50	0.48	131.890	2,571.26	3.23	5.04	14,465,144.920	1,745,260.270	39.830262408	-80.626550183	
2,602.50	0.17	170.870	2,602.26	3.10	5.15	14,465,144.788	1,745,260.374	39.830262044	-80.626549815	
2,634.50	0.15	190.710	2,634.26	3.01	5.15	14,465,144.700	1,745,260.374	39.830261802	-80.626549817	
2,665.50	0.29	274.630	2,665.26	2.98	5.06	14,465,144.666	1,745,260.298	39.830261711	-80.626550123	
2,697.50	0.44	312.420	2,697.26	3.07	4.89	14,465,144.756	1,745,260.117	39.830261959	-80.626550732	
2,729.50	0.57	312.980	2,729.25	3.26	4.68	14,465,144.947	1,745,259.910	39.830262487	-80.626551467	
2,759.50	0.53	311.700	2,759.25	3.45	4.47	14,465,145.141	1,745,259.697	39.830263032	-80.626552222	
2,791.50	0.80	311.720	2,791.25	3.70	4.19	14,465,145.388	1,745,259.420	39.830263704	-80.626553206	
2,823.50	0.85	332.480	2,823.25	4.06	3.91	14,465,145.747	1,745,259.143	39.830264693	-80.626554186	
2,855.50	0.91	335.690	2,855.24	4.50	3.70	14,465,146.189	1,745,258.929	39.830265910	-80.626554942	
2,886.50	0.97	338.030	2,886.24	4.97	3.50	14,465,146.657	1,745,258.729	39.830267196	-80.626555646	
2,918.50	1.05	340.100	2,918.23	5.50	3.30	14,465,147.184	1,745,258.528	39.830268646	-80.626556354	
2,950.50	1.17	340.140	2,950.23	6.08	3.09	14,465,147.767	1,745,258.317	39.830270249	-80.626557097	
2,993.50	1.58	348.010	2,993.22	7.07	2.82	14,465,148.760	1,745,258.045	39.830272978	-80.626558052	
3,045.50	1.89	345.820	3,045.19	8.60	2.46	14,465,150.292	1,745,257.686	39.830277191	-80.626559308	
3,077.50	2.08	352.290	3,077.17	9.69	2.25	14,465,151.379	1,745,257.479	39.830280179	-80.626560029	
3,109.50	1.85	355.260	3,109.15	10.78	2.13	14,465,152.470	1,745,257.358	39.830283175	-80.626560443	
3,141.50	1.09	357.630	3,141.14	11.60	2.07	14,465,153.289	1,745,257.303	39.830285424	-80.626560627	
3,172.50	0.23	350.750	3,172.14	11.96	2.05	14,465,153.645	1,745,257.281	39.830286402	-80.626560701	
3,204.50	0.32	179.780	3,204.14	11.93	2.04	14,465,153.619	1,745,257.271	39.830286331	-80.626560737	
3,236.50	0.63	182.360	3,236.14	11.67	2.04	14,465,153.353	1,745,257.264	39.830285603	-80.626560766	
3,268.50	0.88	185.620	3,268.14	11.25	2.00	14,465,152.933	1,745,257.233	39.830284449	-80.626560883	
3,300.50	1.04	192.190	3,300.13	10.72	1.92	14,465,152.405	1,745,257.147	39.830282999	-80.626561195	
3,331.50	1.13	190.980	3,331.13	10.14	1.80	14,465,151.830	1,745,257.030	39.830281421	-80.626561623	
3,363.50	1.23	195.200	3,363.12	9.50	1.65	14,465,151.188	1,745,256.880	39.830279662	-80.626562167	
3,394.50	1.28	196.440	3,394.11	8.85	1.47	14,465,150.535	1,745,256.694	39.830277870	-80.626562837	
3,426.50	1.25	198.600	3,426.11	8.17	1.25	14,465,149.862	1,745,256.482	39.830276023	-80.626563604	
3,457.50	1.20	198.520	3,457.10	7.55	1.04	14,465,149.233	1,745,256.271	39.830274300	-80.626564364	
3,489.50	1.22	200.580	3,489.09	6.91	0.82	14,465,148.597	1,745,256.045	39.830272554	-80.626565179	
3,521.50	1.14	200.710	3,521.08	6.29	0.58	14,465,147.980	1,745,255.812	39.830270863	-80.626566016	
3,552.50	0.53	213.600	3,552.08	5.88	0.40	14,465,147.572	1,745,255.624	39.830269745	-80.626566693	
3,584.50	0.66	340.960	3,584.08	5.94	0.25	14,465,147.623	1,745,255.482	39.830269887	-80.626567198	
3,615.50	1.42	359.750	3,615.07	6.49	0.19	14,465,148.176	1,745,255.422	39.830271406	-80.626567404	
3,647.50	1.87	3,430	3,647.06	7.41	0.22	14,465,149.094	1,745,255.452	39.830273925	-80.626568285	
3,679.50	2.29	5,610	3,679.04	8.56	0.32	14,465,150.251	1,745,255.545	39.830277103	-80.626568934	
3,710.50	2.53	8,030	3,710.01	9.86	0.47	14,465,151.545	1,745,255.701	39.830280654	-80.626569358	
3,742.50	2.71	7,900	3,741.98	11.31	0.68	14,465,152.994	1,745,255.904	39.830284630	-80.626569615	
3,773.50	2.79	7,890	3,772.94	12.78	0.88	14,465,154.467	1,745,256.108	39.830288674	-80.626564866	
3,804.50	2.42	11,230	3,803.91	14.17	1.11	14,465,155.856	1,745,256.339	39.830292486	-80.626564022	
3,835.50	1.71	7,580	3,834.89	15.27	1.30	14,465,156.957	1,745,256.528	39.830295506	-80.626563334	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,867.50	1.45	5.790	3,866.88	16.14	1.40	14,465,157.833	1,745,256.632	39.830297911	-80.626562951
3,899.50	1.38	4.290	3,898.87	16.93	1.47	14,465,158.620	1,745,256.701	39.830300072	-80.626562692
3,929.50	1.38	4.050	3,928.86	17.65	1.53	14,465,159.340	1,745,256.754	39.830302050	-80.626562494
3,961.50	1.39	0.040	3,960.85	18.42	1.55	14,465,160.113	1,745,256.781	39.830304171	-80.626562384
3,993.50	1.61	359.180	3,992.84	19.26	1.55	14,465,160.950	1,745,256.775	39.830306471	-80.626562394
4,024.50	1.63	359.260	4,023.83	20.14	1.54	14,465,161.827	1,745,256.763	39.830308878	-80.626562423
4,055.50	1.93	358.010	4,054.81	21.10	1.51	14,465,162.789	1,745,256.739	39.830311522	-80.626562494
4,087.50	2.42	359.120	4,086.79	22.32	1.48	14,465,164.003	1,745,256.710	39.830314856	-80.626562579
4,119.50	2.90	0.700	4,118.76	23.80	1.48	14,465,165.488	1,745,256.710	39.830318934	-80.626562559
4,150.50	3.28	359.930	4,149.71	25.47	1.49	14,465,167.159	1,745,256.718	39.830345253	-80.626562504
4,182.50	3.55	1.370	4,181.65	27.38	1.51	14,465,169.065	1,745,256.741	39.830328757	-80.626562395
4,213.50	3.83	0.380	4,212.59	29.37	1.54	14,465,171.060	1,745,256.771	39.830334234	-80.626562259
4,245.50	3.69	354.860	4,244.52	31.47	1.46	14,465,173.154	1,745,256.686	39.830339987	-80.626562532
4,277.50	3.12	349.750	4,276.46	33.35	1.21	14,465,175.037	1,745,256.438	39.830345159	-80.626563384
4,308.50	3.01	345.340	4,307.42	34.97	0.85	14,465,176.654	1,745,256.082	39.830349606	-80.626564628
4,340.50	3.19	345.700	4,339.37	36.64	0.42	14,465,178.330	1,745,255.650	39.830354212	-80.626566144
4,372.50	3.44	344.280	4,371.32	38.43	-0.06	14,465,180.117	1,745,255.170	39.830359125	-80.626567827
4,404.50	3.74	347.030	4,403.26	40.37	-0.55	14,465,182.058	1,745,254.675	39.830364462	-80.626569559
4,435.50	3.67	348.160	4,434.19	42.33	-0.98	14,465,184.014	1,745,254.245	39.830369839	-80.626571064
4,467.50	3.37	352.760	4,466.13	44.26	-1.31	14,465,185.950	1,745,253.916	39.830375158	-80.626572206
4,498.50	3.22	357.070	4,497.08	46.04	-1.47	14,465,187.723	1,745,253.757	39.830380030	-80.626572747
4,530.50	3.26	359.980	4,529.03	47.84	-1.52	14,465,189.531	1,745,253.711	39.830384994	-80.626572885
4,562.50	3.48	1.430	4,560.97	49.72	-1.49	14,465,191.411	1,745,253.734	39.830390158	-80.626572772
4,594.50	3.78	1.510	4,592.91	51.75	-1.44	14,465,193.437	1,745,253.787	39.830395720	-80.626572556
4,626.50	3.59	4.890	4,624.84	53.80	-1.33	14,465,195.489	1,745,253.900	39.830401356	-80.626572122
4,658.50	3.01	5.330	4,656.79	55.64	-1.17	14,465,197.324	1,745,254.063	39.830406392	-80.626571513
4,689.50	2.97	7.670	4,687.75	57.24	-0.98	14,465,198.930	1,745,254.246	39.830410802	-80.626570838
4,721.50	2.78	10.870	4,719.71	58.83	-0.73	14,465,200.514	1,745,254.503	39.830415148	-80.626569899
4,753.50	2.15	16.380	4,751.68	60.16	-0.41	14,465,201.852	1,745,254.819	39.830418819	-80.626568755
4,785.50	1.77	15.560	4,783.66	61.22	-0.11	14,465,202.904	1,745,255.120	39.830421704	-80.626567664
4,816.50	1.24	11.610	4,814.65	62.01	0.09	14,465,203.694	1,745,255.316	39.830423871	-80.626566954
4,848.50	1.12	7.270	4,846.64	62.66	0.20	14,465,204.343	1,745,255.426	39.830425653	-80.626566556
4,879.50	1.18	356.340	4,877.64	63.27	0.22	14,465,204.962	1,745,255.444	39.830427353	-80.626566482
4,911.50	1.17	356.950	4,909.63	63.93	0.18	14,465,205.617	1,745,255.405	39.830429152	-80.626566610
4,943.50	0.79	347.870	4,941.62	64.47	0.11	14,465,206.159	1,745,255.341	39.830430641	-80.626566829
4,975.50	0.50	323.980	4,973.62	64.80	-0.02	14,465,206.488	1,745,255.213	39.830431545	-80.626567281
5,007.50	0.31	292.790	5,005.62	64.95	-0.18	14,465,206.634	1,745,255.051	39.830431949	-80.626567856
5,039.50	0.35	271.860	5,037.62	64.98	-0.35	14,465,206.671	1,745,254.874	39.830432052	-80.626568487
5,070.50	0.44	256.300	5,068.62	64.96	-0.56	14,465,206.646	1,745,254.663	39.830431985	-80.626569237
5,102.50	0.41	246.630	5,100.62	64.88	-0.79	14,465,206.571	1,745,254.439	39.830431783	-80.626570037
5,133.50	0.51	250.410	5,131.62	64.79	-1.02	14,465,206.481	1,745,254.207	39.830431538	-80.626570864
5,165.50	0.64	236.450	5,163.62	64.65	-1.30	14,465,206.335	1,745,253.924	39.830431139	-80.626571875
5,197.50	0.62	234.560	5,195.61	64.45	-1.59	14,465,206.135	1,745,253.634	39.830430595	-80.626572911
5,228.50	0.67	241.810	5,226.61	64.26	-1.89	14,465,205.952	1,745,253.338	39.830430095	-80.626573968
5,260.50	0.72	233.490	5,258.61	64.06	-2.22	14,465,205.743	1,745,253.012	39.830429526	-80.626575133
5,292.50	0.91	238.670	5,290.61	63.80	-2.60	14,465,205.492	1,745,252.633	39.830428839	-80.626576486
5,323.50	0.98	241.220	5,321.60	63.55	-3.04	14,465,205.236	1,745,252.190	39.830428142	-80.626578066
5,355.50	0.80	236.240	5,353.60	63.29	-3.46	14,465,204.980	1,745,251.765	39.830427444	-80.626579586
5,385.50	0.67	237.340	5,383.60	63.08	-3.79	14,465,204.789	1,745,251.443	39.830426868	-80.626580735
5,417.50	0.49	237.170	5,415.59	62.91	-4.06	14,465,204.594	1,745,251.170	39.830426390	-80.626581708
5,449.50	0.15	237.480	5,447.59	62.81	-4.21	14,465,204.497	1,745,251.020	39.830426126	-80.626582245
5,480.50	0.18	193.630	5,478.59	62.74	-4.25	14,465,204.428	1,745,250.974	39.830425937	-80.626582409
5,512.50	0.20	222.210	5,510.59	62.65	-4.30	14,465,204.338	1,745,250.925	39.830425690	-80.626582586
5,544.50	0.11	173.810	5,542.59	62.58	-4.34	14,465,204.266	1,745,250.891	39.830425493	-80.626582709



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,575.50	0.41	99.140	5,573.59	62.53	-4.22	14,465,204.219	1,745,251.004	39.830425362	-80.626582308
5,607.50	0.68	96.440	5,605.59	62.49	-3.92	14,465,204.179	1,745,251.305	39.830425250	-80.626581234
5,638.50	0.74	87.960	5,636.59	62.48	-3.54	14,465,204.166	1,745,251.688	39.830425209	-80.626579871
5,670.50	1.04	88.250	5,668.59	62.49	-3.04	14,465,204.182	1,745,252.185	39.830425247	-80.626578101
5,701.50	1.15	83.970	5,699.58	62.54	-2.45	14,465,204.223	1,745,252.775	39.830425354	-80.626575997
5,733.50	1.05	91.950	5,731.57	62.56	-1.84	14,465,204.247	1,745,253.388	39.830425412	-80.626573815
5,764.50	0.81	95.870	5,762.57	62.53	-1.34	14,465,204.215	1,745,253.890	39.830425318	-80.626572028
5,796.50	0.76	95.680	5,794.57	62.48	-0.90	14,465,204.171	1,745,254.326	39.830425192	-80.626570475
5,827.50	0.81	95.290	5,825.56	62.44	-0.48	14,465,204.130	1,745,254.749	39.830425076	-80.626568970
5,859.50	0.82	92.340	5,857.56	62.41	-0.03	14,465,204.100	1,745,255.203	39.830424988	-80.626567353
5,900.00	0.78	88.260	5,898.06	62.41	0.54	14,465,204.097	1,745,255.768	39.830424972	-80.626565340
5,993.00	1.09	103.030	5,991.04	62.23	2.03	14,465,203.916	1,745,257.262	39.830424460	-80.626560020
6,087.00	1.31	107.900	6,085.02	61.70	3.93	14,465,203.385	1,745,259.156	39.830422978	-80.626553283
6,180.00	0.77	96.060	6,178.01	61.30	5.56	14,465,202.992	1,745,260.789	39.830421880	-80.626547472
6,273.00	0.68	69.030	6,271.00	61.44	6.70	14,465,203.123	1,745,261.926	39.830422228	-80.626543421
6,367.00	0.25	266.430	6,365.00	61.62	7.01	14,465,203.310	1,745,262.242	39.830422738	-80.626542292
6,460.00	0.73	281.310	6,458.00	61.73	6.23	14,465,203.414	1,745,261.458	39.830423031	-80.626545081
6,553.00	1.11	285.130	6,550.98	62.08	4.78	14,465,203.765	1,745,260.008	39.830424013	-80.626550243
6,646.00	0.33	316.660	6,643.98	62.51	3.73	14,465,204.195	1,745,258.954	39.830425205	-80.626553988
6,739.00	0.15	69.150	6,736.98	62.75	3.66	14,465,204.433	1,745,258.884	39.830425860	-80.626554234
6,833.00	0.43	75.220	6,830.97	62.88	4.11	14,465,204.567	1,745,259.340	39.830426222	-80.626552608
6,988.00	0.38	81.480	6,985.97	63.10	5.18	14,465,204.791	1,745,260.411	39.830426827	-80.626548791
7,112.00	2.80	346.790	7,109.92	66.11	4.90	14,465,207.802	1,745,260.126	39.830435096	-80.626549763
7,204.00	5.10	346.220	7,201.70	72.27	3.41	14,465,213.961	1,745,258.638	39.830452030	-80.626554971
7,298.00	7.18	344.010	7,295.15	81.98	0.80	14,465,223.667	1,745,256.024	39.830478714	-80.626564136
7,391.00	9.10	338.030	7,387.21	94.39	-3.56	14,465,236.076	1,745,251.671	39.830512841	-80.626579456
7,484.00	11.12	332.420	7,478.77	109.16	-10.46	14,465,250.847	1,745,244.767	39.830533485	-80.626503830
7,671.00	13.24	329.140	7,661.55	143.53	-29.80	14,465,285.218	1,745,225.431	39.830648096	-80.626672191
7,764.00	13.39	331.270	7,752.05	162.12	-40.44	14,465,303.803	1,745,214.792	39.830699256	-80.626709810
7,857.00	13.57	331.230	7,842.49	181.12	-50.86	14,465,322.809	1,745,204.365	39.830751571	-80.626746668
8,046.00	14.40	328.920	8,025.88	220.69	-73.67	14,465,362.373	1,745,181.561	39.830860484	-80.626827308
8,140.00	14.15	332.420	8,116.98	240.88	-85.02	14,465,382.568	1,745,170.207	39.830916074	-80.626867449
8,233.00	13.82	337.130	8,207.23	261.19	-94.60	14,465,402.879	1,745,160.627	39.830971962	-80.626901271
8,327.00	14.50	338.130	8,298.37	282.46	-103.35	14,465,424.145	1,745,151.880	39.831030462	-80.626932111
8,420.00	14.66	336.890	8,388.38	304.09	-112.30	14,465,445.773	1,745,142.924	39.831089960	-80.626963691
8,513.00	15.13	335.930	8,478.25	325.99	-121.87	14,465,467.679	1,745,133.355	39.831150228	-80.626997450
8,606.00	15.50	334.720	8,567.95	348.31	-132.13	14,465,489.997	1,745,123.098	39.831211636	-80.627033653
8,700.00	15.31	336.250	8,658.57	371.03	-142.49	14,465,512.714	1,745,112.736	39.831274139	-80.627070224
8,794.00	14.29	337.690	8,749.45	393.12	-151.89	14,465,534.806	1,745,103.334	39.831334916	-80.627103386
8,888.00	12.75	337.370	8,840.85	413.43	-160.29	14,465,555.114	1,745,094.938	39.831393782	-80.627132990
8,981.00	11.79	341.420	8,931.72	431.91	-167.27	14,465,573.593	1,745,087.962	39.831441609	-80.627157565
9,075.00	12.73	338.610	9,023.58	450.65	-174.10	14,465,592.340	1,745,081.124	39.831493170	-80.627181641
9,168.00	13.46	337.160	9,114.16	470.17	-182.04	14,465,611.856	1,745,073.186	39.831546856	-80.627209628
9,262.00	14.33	337.120	9,205.41	490.97	-190.81	14,465,632.656	1,745,064.416	39.831604078	-80.627240556
9,354.00	15.88	337.680	9,294.23	513.10	-200.02	14,465,654.790	1,745,055.209	39.831664970	-80.627273023
9,447.00	15.85	336.370	9,383.69	536.51	-209.94	14,465,678.196	1,745,045.286	39.831729360	-80.627308020
9,540.00	15.20	337.940	9,473.29	559.44	-219.61	14,465,701.130	1,745,035.617	39.831792454	-80.627342123
9,634.00	14.64	338.880	9,564.12	581.95	-228.52	14,465,723.632	1,745,026.708	39.831854351	-80.627373521
9,726.00	14.90	337.380	9,653.08	603.71	-237.26	14,465,745.396	1,745,017.970	39.831914219	-80.627404325
9,819.00	16.26	337.670	9,742.66	626.79	-246.81	14,465,768.478	1,745,008.424	39.831977715	-80.627437985
9,913.00	15.66	337.630	9,833.04	650.70	-256.63	14,465,792.383	1,744,998.595	39.832043476	-80.627472639
10,006.00	14.28	336.170	9,922.88	672.80	-266.05	14,465,814.483	1,744,989.184	39.832104275	-80.627505835
10,100.00	13.08	335.480	10,014.21	693.08	-275.14	14,465,834.766	1,744,980.085	39.832160080	-80.627537943
10,193.00	11.51	335.770	10,105.08	711.12	-283.32	14,465,852.802	1,744,971.909	39.832209706	-80.627566797



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,286.00	10.16	336.900	10,196.42	727.12	-290.35	14,465,868.809	1,744,964.883	39.832253744	-80.627591588
10,379.00	9.21	334.960	10,288.09	741.41	-296.71	14,465,883.097	1,744,958.515	39.832293056	-80.627614060
10,472.00	7.65	337.770	10,380.08	753.88	-302.21	14,465,895.571	1,744,953.022	39.832327374	-80.627633439
10,566.00	6.26	335.490	10,473.39	764.34	-306.70	14,465,906.026	1,744,948.529	39.832356138	-80.627649289
10,659.00	4.54	329.490	10,565.97	772.12	-310.67	14,465,913.811	1,744,944.557	39.832377563	-80.627663323
10,752.00	3.16	326.610	10,658.76	777.44	-313.95	14,465,919.123	1,744,941.277	39.832392187	-80.627674926
10,845.00	2.42	325.290	10,751.65	781.19	-316.48	14,465,922.877	1,744,938.748	39.832402526	-80.627683878
10,961.00	2.51	328.630	10,867.54	785.37	-319.20	14,465,927.059	1,744,936.032	39.832414042	-80.627693493
11,054.00	1.49	328.980	10,960.49	788.15	-320.88	14,465,929.834	1,744,934.348	39.832421682	-80.627699447
11,148.00	0.53	255.500	11,054.47	789.09	-321.93	14,465,930.773	1,744,933.298	39.832424271	-80.627703176
11,242.00	1.27	178.510	11,148.46	787.94	-322.33	14,465,929.622	1,744,932.904	39.832421117	-80.627704596
11,343.00	1.19	181.850	11,249.44	785.77	-322.33	14,465,927.455	1,744,932.899	39.832415165	-80.627704645
11,437.00	0.92	205.050	11,343.43	784.11	-322.68	14,465,925.796	1,744,932.548	39.832410613	-80.627705920
11,530.00	1.32	154.520	11,436.41	782.47	-322.54	14,465,924.153	1,744,932.693	39.832406098	-80.627705429
11,623.00	1.05	165.060	11,529.39	780.68	-321.86	14,465,922.362	1,744,933.373	39.832401174	-80.627703032
11,716.00	2.24	135.440	11,622.35	778.56	-320.36	14,465,920.244	1,744,934.868	39.832395339	-80.627697738
11,809.00	2.11	134.480	11,715.28	776.06	-317.86	14,465,917.749	1,744,937.365	39.832388460	-80.627688881
11,902.00	2.02	158.210	11,808.23	773.34	-316.03	14,465,915.028	1,744,939.195	39.832380965	-80.627682403
11,996.00	1.67	168.490	11,902.18	770.46	-315.15	14,465,912.147	1,744,940.083	39.832373044	-80.627679282
12,089.00	1.54	168.750	11,995.14	767.91	-314.63	14,465,909.594	1,744,940.597	39.832366026	-80.627677488
12,182.00	1.27	161.280	12,088.11	765.71	-314.06	14,465,907.392	1,744,941.172	39.832359973	-80.627675474
12,224.00	1.14	159.000	12,130.10	764.87	-313.76	14,465,906.561	1,744,941.471	39.832357688	-80.627674421
Survey @ 12224.00 MD 12130.10 TVD									
12,286.00	1.14	159.000	12,192.09	763.72	-313.32	14,465,905.410	1,744,941.913	39.832354520	-80.627672864
Survey Proj. to 12286.00 MD 12192.09 TVD									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
214.50	214.50	-0.27	0.20	MWD surveys
12,224.00	12,130.10	764.87	-313.76	Survey @ 12224.00 MD 12130.10 TVD
12,286.00	12,192.09	763.72	-313.32	Survey Proj. to 12286.00 MD 12192.09 TVD

Checked By: _____ Approved By: _____ Date: _____



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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-20 HU (slot T)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,141.688 usft	Latitude:	39.830253590
	+E/-W	0.00 ft	Easting:	1,745,255.228 usft	Longitude:	-80.626568190
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	1,370.00 ft
Grid Convergence:	0.24 °					

Wellbore	Sidetrack 01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	6/15/2022	-8.72	66.46	51,656.37798156

Design	Surveys Sidetrack 01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	11,054.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	149.718	

Survey Program	Date 10/21/2022			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
214.50	1,163.50	MWD surf (Original Hole)	MWD	MWD - Standard
1,211.50	2,993.50	MWD int (Original Hole)	MWD	MWD - Standard
3,045.50	5,859.50	MWD 3045.5-5859.5 MD (Original Hole)	MWD	MWD - Standard
5,900.00	10,845.00	MWD int2 (Original Hole)	MWD	MWD - Standard
10,961.00	11,054.00	MWD (Original Hole)	MWD	MWD - Standard
11,079.00	16,533.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard
16,561.00	16,646.00	Projection ST1 (Sidetrack 01)	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
214.50	0.18	144.480	214.50	-0.27	0.20	0.34	0.08	0.08	0.00	0.00
245.50	0.11	42.990	245.50	-0.29	0.24	0.38	0.74	-0.23	-327.39	
273.50	0.17	46.490	273.50	-0.24	0.29	0.36	0.22	0.21	12.50	
302.50	0.15	48.000	302.50	-0.19	0.35	0.34	0.07	-0.07	5.21	



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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)
330.50	0.17	23.310	330.50	-0.13	0.40	0.31	0.25	0.07	-88.18
362.50	0.21	324.750	362.50	-0.03	0.38	0.22	0.59	0.13	-183.00
394.50	0.26	8.330	394.50	0.09	0.36	0.11	0.56	0.16	136.19
424.50	0.30	349.160	424.50	0.23	0.35	-0.02	0.34	0.13	-63.90
456.50	0.12	123.870	456.50	0.29	0.36	-0.07	1.23	-0.56	420.97
488.50	0.23	357.560	488.50	0.34	0.39	-0.10	0.99	0.34	-394.72
520.50	0.34	326.270	520.50	0.48	0.33	-0.25	0.58	0.34	-97.78
551.50	0.34	33.400	551.50	0.64	0.33	-0.38	1.21	0.00	216.55
583.50	0.54	12.590	583.50	0.86	0.42	-0.53	0.79	0.63	-65.03
615.50	0.62	357.490	615.49	1.18	0.44	-0.80	0.54	0.25	-47.19
647.50	0.74	338.480	647.49	1.55	0.36	-1.15	0.79	0.38	-59.41
678.50	0.67	358.780	678.49	1.91	0.28	-1.51	0.83	-0.23	65.48
710.50	1.01	347.910	710.49	2.38	0.22	-1.94	1.17	1.06	-33.97
742.50	0.93	2.950	742.48	2.91	0.17	-2.43	0.83	-0.25	47.00
773.50	1.44	355.180	773.48	3.55	0.16	-2.99	1.72	1.65	-25.06
805.50	0.79	6.060	805.47	4.17	0.14	-3.53	2.13	-2.03	34.00
837.50	0.60	7.450	837.47	4.56	0.19	-3.84	0.60	-0.59	4.34
869.50	0.12	329.430	869.47	4.75	0.19	-4.01	1.60	-1.50	-118.81
901.50	0.19	37.620	901.47	4.82	0.21	-4.06	0.57	0.22	213.09
932.50	0.17	36.980	932.47	4.90	0.27	-4.10	0.06	-0.06	-2.06
964.50	0.22	7.580	964.47	5.00	0.31	-4.16	0.34	0.16	-91.88
996.50	0.41	25.830	996.47	5.16	0.36	-4.28	0.66	0.59	57.03
1,059.50	0.64	6.830	1,059.46	5.72	0.50	-4.68	0.45	0.37	-30.16
1,122.50	0.73	8.380	1,122.46	6.46	0.60	-5.28	0.15	0.14	2.46
1,163.50	0.79	31.650	1,163.45	6.96	0.79	-5.61	0.76	0.15	56.76
1,211.50	0.52	33.930	1,211.45	7.42	1.09	-5.86	0.57	-0.56	4.75
1,243.50	0.62	21.970	1,243.45	7.70	1.23	-6.03	0.48	0.31	-37.38
1,274.50	0.74	25.790	1,274.45	8.04	1.38	-6.25	0.41	0.39	12.32
1,306.50	1.01	35.520	1,306.44	8.46	1.63	-6.48	0.96	0.84	30.41
1,337.50	1.10	39.950	1,337.44	8.91	1.98	-6.69	0.39	0.29	14.29
1,369.50	1.36	40.050	1,369.43	9.43	2.43	-6.92	0.81	0.81	0.31
1,401.50	1.53	36.310	1,401.42	10.07	2.92	-7.22	0.61	0.53	-11.69
1,432.50	1.39	43.730	1,432.41	10.67	3.43	-7.49	0.76	-0.45	23.94
1,464.50	1.28	48.980	1,464.40	11.19	3.97	-7.66	0.51	-0.34	16.41
1,495.50	1.15	39.980	1,495.40	11.65	4.43	-7.83	0.74	-0.42	-29.03
1,527.50	0.89	48.800	1,527.39	12.06	4.82	-7.99	0.95	-0.81	27.56
1,558.50	0.60	65.620	1,558.39	12.29	5.15	-8.02	1.16	-0.94	54.26
1,590.50	0.31	113.070	1,590.39	12.32	5.38	-7.93	1.41	-0.91	148.28
1,622.50	0.43	151.830	1,622.39	12.18	5.52	-7.74	0.84	0.38	121.13
1,654.50	0.38	155.370	1,654.39	11.98	5.62	-7.51	0.17	-0.16	11.06
1,686.50	0.39	194.190	1,686.38	11.78	5.64	-7.33	0.80	0.03	121.31
1,717.50	0.31	213.680	1,717.38	11.61	5.56	-7.22	0.46	-0.26	62.87
1,749.50	0.24	248.360	1,749.38	11.51	5.45	-7.19	0.55	-0.22	108.38



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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)
1,780.50	0.28	269.990	1,780.38	11.49	5.32	-7.24	0.34	0.13	69.77
1,812.50	0.36	280.910	1,812.38	11.51	5.14	-7.34	0.31	0.25	34.13
1,843.50	0.51	291.250	1,843.38	11.57	4.92	-7.52	0.54	0.48	33.35
1,875.50	0.62	283.160	1,875.38	11.67	4.62	-7.75	0.42	0.34	-25.28
1,907.50	0.81	284.580	1,907.38	11.76	4.23	-8.02	0.60	0.59	4.44
1,939.50	0.98	280.910	1,939.37	11.87	3.74	-8.36	0.56	0.53	-11.47
1,970.50	0.89	262.320	1,970.37	11.89	3.24	-8.63	1.02	-0.29	-59.97
2,001.50	1.10	239.570	2,001.37	11.71	2.75	-8.72	1.43	0.68	-73.39
2,033.50	1.50	223.000	2,033.36	11.24	2.20	-8.60	1.70	1.25	-51.78
2,064.50	1.50	215.090	2,064.35	10.61	1.69	-8.32	0.67	0.00	-25.52
2,096.50	1.52	209.520	2,096.34	9.90	1.24	-7.93	0.46	0.06	-17.41
2,128.50	1.03	203.490	2,128.33	9.27	0.91	-7.54	1.59	-1.53	-18.84
2,159.50	1.07	180.260	2,159.32	8.72	0.80	-7.13	1.37	0.13	-74.94
2,191.50	0.93	173.210	2,191.32	8.17	0.83	-6.64	0.58	-0.44	-22.03
2,222.50	0.97	162.010	2,222.31	7.67	0.94	-6.15	0.61	0.13	-36.13
2,254.50	1.09	150.510	2,254.31	7.15	1.17	-5.58	0.75	0.38	-35.94
2,286.50	1.22	146.800	2,286.30	6.60	1.51	-4.93	0.47	0.41	-11.59
2,317.50	1.20	146.030	2,317.30	6.05	1.87	-4.28	0.08	-0.06	-2.48
2,349.50	1.21	134.630	2,349.29	5.54	2.30	-3.62	0.75	0.03	-35.63
2,381.50	1.08	143.300	2,381.28	5.06	2.72	-2.99	0.68	-0.41	27.09
2,413.50	1.22	123.810	2,413.28	4.63	3.18	-2.39	1.29	0.44	-60.91
2,444.50	1.03	131.480	2,444.27	4.26	3.67	-1.83	0.78	-0.61	24.74
2,476.50	0.92	122.970	2,476.26	3.93	4.10	-1.32	0.57	-0.34	-26.59
2,507.50	0.75	129.890	2,507.26	3.66	4.46	-0.91	0.64	-0.55	22.32
2,539.50	0.68	122.750	2,539.26	3.42	4.78	-0.55	0.35	-0.22	-22.31
2,571.50	0.48	131.890	2,571.26	3.23	5.04	-0.25	0.69	-0.63	28.56
2,602.50	0.17	170.870	2,602.26	3.10	5.15	-0.08	1.17	-1.00	125.74
2,634.50	0.15	190.710	2,634.26	3.01	5.15	-0.01	0.18	-0.06	62.00
2,665.50	0.29	274.630	2,665.26	2.98	5.06	-0.02	1.01	0.45	270.71
2,697.50	0.44	312.420	2,697.26	3.07	4.89	-0.18	0.86	0.47	118.09
2,729.50	0.57	312.980	2,729.25	3.26	4.68	-0.45	0.41	0.41	1.75
2,759.50	0.53	311.700	2,759.25	3.45	4.47	-0.73	0.14	-0.13	-4.27
2,791.50	0.80	311.720	2,791.25	3.70	4.19	-1.08	0.84	0.84	0.06
2,823.50	0.85	332.480	2,823.25	4.06	3.91	-1.53	0.94	0.16	64.88
2,855.50	0.91	335.690	2,855.24	4.50	3.70	-2.02	0.24	0.19	10.03
2,886.50	0.97	338.030	2,886.24	4.97	3.50	-2.53	0.23	0.19	7.55
2,918.50	1.05	340.100	2,918.23	5.50	3.30	-3.08	0.27	0.25	6.47
2,950.50	1.17	340.140	2,950.23	6.08	3.09	-3.69	0.38	0.38	0.13
2,993.50	1.58	348.010	2,993.22	7.07	2.82	-4.69	1.05	0.95	18.30
3,045.50	1.89	345.820	3,045.19	8.60	2.46	-6.19	0.61	0.60	-4.21
3,077.50	2.08	352.290	3,077.17	9.69	2.25	-7.23	0.92	0.59	20.22
3,109.50	1.85	355.260	3,109.15	10.78	2.13	-8.24	0.79	-0.72	9.28
3,141.50	1.09	357.630	3,141.14	11.60	2.07	-8.97	2.38	-2.38	7.41



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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)
3,172.50	0.23	350.750	3,172.14	11.96	2.05	-9.29	2.78	-2.77	-22.19
3,204.50	0.32	179.780	3,204.14	11.93	2.04	-9.27	1.71	0.28	-534.28
3,236.50	0.63	182.360	3,236.14	11.67	2.04	-9.05	0.97	0.97	8.06
3,268.50	0.88	185.620	3,268.14	11.25	2.00	-8.70	0.79	0.78	10.19
3,300.50	1.04	192.190	3,300.13	10.72	1.92	-8.29	0.61	0.50	20.53
3,331.50	1.13	190.980	3,331.13	10.14	1.80	-7.85	0.30	0.29	-3.90
3,363.50	1.23	195.200	3,363.12	9.50	1.65	-7.37	0.41	0.31	13.19
3,394.50	1.28	196.440	3,394.11	8.85	1.47	-6.90	0.18	0.16	4.00
3,426.50	1.25	198.600	3,426.11	8.17	1.25	-6.43	0.18	-0.09	6.75
3,457.50	1.20	198.520	3,457.10	7.55	1.04	-5.99	0.16	-0.16	-0.26
3,489.50	1.22	200.580	3,489.09	6.91	0.82	-5.55	0.15	0.06	6.44
3,521.50	1.14	200.710	3,521.08	6.29	0.58	-5.14	0.25	-0.25	0.41
3,552.50	0.53	213.600	3,552.08	5.88	0.40	-4.88	2.05	-1.97	41.58
3,584.50	0.66	340.960	3,584.08	5.94	0.25	-5.00	3.34	0.41	398.00
3,615.50	1.42	359.750	3,615.07	6.49	0.19	-5.51	2.66	2.45	60.61
3,647.50	1.87	3.430	3,647.06	7.41	0.22	-6.28	1.44	1.41	11.50
3,679.50	2.29	5.610	3,679.04	8.56	0.32	-7.23	1.34	1.31	6.81
3,710.50	2.53	8.030	3,710.01	9.86	0.47	-8.27	0.84	0.77	7.81
3,742.50	2.71	7.900	3,741.98	11.31	0.68	-9.42	0.56	0.56	-0.41
3,773.50	2.79	7.890	3,772.94	12.78	0.88	-10.59	0.26	0.26	-0.03
3,804.50	2.42	11.230	3,803.91	14.17	1.11	-11.67	1.29	-1.19	10.77
3,835.50	1.71	7.580	3,834.89	15.27	1.30	-12.53	2.33	-2.29	-11.77
3,867.50	1.45	5.790	3,866.88	16.14	1.40	-13.23	0.83	-0.81	-5.59
3,899.50	1.38	4.290	3,898.87	16.93	1.47	-13.88	0.25	-0.22	-4.69
3,929.50	1.38	4.050	3,928.86	17.65	1.53	-14.47	0.02	0.00	-0.80
3,961.50	1.39	0.040	3,960.85	18.42	1.55	-15.13	0.30	0.03	-12.53
3,993.50	1.61	359.180	3,992.84	19.26	1.55	-15.85	0.69	0.69	-2.69
4,024.50	1.63	359.260	4,023.83	20.14	1.54	-16.62	0.06	0.06	0.26
4,055.50	1.93	358.010	4,054.81	21.10	1.51	-17.46	0.98	0.97	-4.03
4,087.50	2.42	359.120	4,086.79	22.32	1.48	-18.52	1.54	1.53	3.47
4,119.50	2.90	0.700	4,118.76	23.80	1.48	-19.81	1.52	1.50	4.94
4,150.50	3.28	359.930	4,149.71	25.47	1.49	-21.24	1.23	1.23	-2.48
4,182.50	3.55	1.370	4,181.65	27.38	1.51	-22.88	0.89	0.84	4.50
4,213.50	3.83	0.380	4,212.59	29.37	1.54	-24.59	0.93	0.90	-3.19
4,245.50	3.69	354.860	4,244.52	31.47	1.46	-26.44	1.21	-0.44	-17.25
4,277.50	3.12	349.750	4,276.46	33.35	1.21	-28.19	2.02	-1.78	-15.97
4,308.50	3.01	345.340	4,307.42	34.97	0.85	-29.76	0.84	-0.35	-14.23
4,340.50	3.19	345.700	4,339.37	36.84	0.42	-31.43	0.57	0.56	1.13
4,372.50	3.44	344.280	4,371.32	38.43	-0.06	-33.21	0.82	0.78	-4.44
4,404.50	3.74	347.030	4,403.26	40.37	-0.55	-35.14	1.08	0.94	8.59
4,435.50	3.67	348.160	4,434.19	42.33	-0.98	-37.05	0.33	-0.23	3.65
4,467.50	3.37	352.760	4,466.13	44.26	-1.31	-38.88	1.29	-0.94	14.38
4,498.50	3.22	357.070	4,497.08	46.04	-1.47	-40.50	0.93	-0.48	13.90
4,530.50	3.26	359.980	4,529.03	47.84	-1.52	-42.08	0.53	0.13	9.09



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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)
4,562.50	3.48	1.430	4,560.97	49.72	-1.49	-43.69	0.74	0.69	4.53
4,594.50	3.78	1.510	4,592.91	51.75	-1.44	-45.41	0.94	0.94	0.25
4,626.50	3.59	4.890	4,624.84	53.80	-1.33	-47.13	0.90	-0.59	10.56
4,658.50	3.01	5.330	4,656.79	55.64	-1.17	-48.63	1.81	-1.81	1.38
4,689.50	2.97	7.670	4,687.75	57.24	-0.98	-49.93	0.41	-0.13	7.55
4,721.50	2.78	10.870	4,719.71	58.83	-0.73	-51.17	0.78	-0.59	10.00
4,753.50	2.15	16.380	4,751.68	60.16	-0.41	-52.16	2.10	-1.97	17.22
4,785.50	1.77	15.560	4,783.66	61.22	-0.11	-52.92	1.19	-1.19	-2.56
4,816.50	1.24	11.610	4,814.65	62.01	0.09	-53.50	1.74	-1.71	-12.74
4,848.50	1.12	7.270	4,846.64	62.66	0.20	-54.01	0.47	-0.38	-13.56
4,879.50	1.18	356.340	4,877.64	63.27	0.22	-54.53	0.73	0.19	-35.26
4,911.50	1.17	356.950	4,909.63	63.93	0.18	-55.12	0.05	-0.03	1.91
4,943.50	0.79	347.870	4,941.62	64.47	0.11	-55.62	1.28	-1.19	-28.38
4,975.50	0.50	323.980	4,973.62	64.80	-0.02	-55.97	1.22	-0.91	-74.66
5,007.50	0.31	292.790	5,005.62	64.95	-0.18	-56.17	0.89	-0.59	-97.47
5,039.50	0.35	271.860	5,037.62	64.98	-0.35	-56.30	0.39	0.13	-65.41
5,070.50	0.44	256.300	5,068.62	64.96	-0.56	-56.38	0.45	0.29	-50.19
5,102.50	0.41	246.630	5,100.62	64.88	-0.79	-56.43	0.24	-0.09	-30.22
5,133.50	0.51	250.410	5,131.62	64.79	-1.02	-56.47	0.34	0.32	12.19
5,165.50	0.64	236.450	5,163.62	64.65	-1.30	-56.48	0.59	0.41	-43.63
5,197.50	0.62	234.560	5,195.61	64.45	-1.59	-56.46	0.09	-0.06	-5.91
5,228.50	0.67	241.610	5,226.61	64.26	-1.89	-56.45	0.30	0.16	22.74
5,260.50	0.72	233.490	5,258.61	64.06	-2.22	-56.43	0.34	0.16	-25.38
5,292.50	0.91	238.670	5,290.61	63.80	-2.60	-56.41	0.64	0.59	16.19
5,323.50	0.98	241.220	5,321.60	63.55	-3.04	-56.41	0.26	0.23	8.23
5,355.50	0.80	236.240	5,353.60	63.29	-3.46	-56.40	0.61	-0.56	-15.56
5,385.50	0.67	237.340	5,383.60	63.08	-3.79	-56.38	0.44	-0.43	3.67
5,417.50	0.49	237.170	5,415.59	62.91	-4.06	-56.37	0.56	-0.56	-0.53
5,449.50	0.15	237.480	5,447.59	62.81	-4.21	-56.36	1.06	-1.06	0.97
5,480.50	0.18	193.630	5,478.59	62.74	-4.25	-56.32	0.41	0.10	-141.45
5,512.50	0.20	222.210	5,510.59	62.65	-4.30	-56.27	0.30	0.06	89.31
5,544.50	0.11	173.810	5,542.59	62.58	-4.34	-56.23	0.47	-0.28	-151.25
5,575.50	0.41	99.140	5,573.59	62.53	-4.22	-56.13	1.28	0.97	-240.87
5,607.50	0.68	96.440	5,605.59	62.49	-3.92	-55.94	0.85	0.84	-8.44
5,638.50	0.74	87.960	5,636.59	62.48	-3.54	-55.74	0.39	0.19	-27.35
5,670.50	1.04	88.250	5,668.59	62.49	-3.04	-55.50	0.94	0.94	0.91
5,701.50	1.15	83.970	5,699.58	62.54	-2.45	-55.24	0.44	0.35	-13.81
5,733.50	1.05	91.950	5,731.57	62.56	-1.84	-54.95	0.57	-0.31	24.94
5,764.50	0.81	95.870	5,762.57	62.53	-1.34	-54.67	0.80	-0.77	12.65
5,796.50	0.76	95.680	5,794.57	62.48	-0.90	-54.41	0.16	-0.16	-0.59
5,827.50	0.81	95.290	5,825.56	62.44	-0.48	-54.16	0.16	0.16	-1.26
5,859.50	0.82	92.340	5,857.56	62.41	-0.03	-53.91	0.13	0.03	-9.22
5,900.00	0.78	88.260	5,898.06	62.41	0.54	-53.62	0.17	-0.10	-10.07



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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)
5,993.00	1.09	103.030	5,991.04	62.23	2.03	-52.71	0.42	0.33	15.88
6,087.00	1.31	107.900	6,085.02	61.70	3.93	-51.30	0.26	0.23	5.18
6,180.00	0.77	96.060	6,178.01	61.30	5.56	-50.14	0.62	-0.58	-12.73
6,273.00	0.68	89.030	6,271.00	61.44	6.70	-49.68	0.38	-0.10	-29.06
6,367.00	0.25	266.430	6,365.00	61.62	7.01	-49.68	0.98	-0.46	-172.98
6,460.00	0.73	281.310	6,458.00	61.73	6.23	-50.16	0.53	0.52	16.00
6,553.00	1.11	285.130	6,550.98	62.08	4.78	-51.20	0.41	0.41	4.11
6,646.00	0.33	316.660	6,643.98	62.51	3.73	-52.10	0.91	-0.84	33.90
6,739.00	0.15	69.150	6,736.98	62.75	3.66	-52.34	0.44	-0.19	120.96
6,833.00	0.43	75.220	6,830.97	62.88	4.11	-52.23	0.30	0.30	6.46
6,988.00	0.38	81.480	6,985.97	63.10	5.18	-51.88	0.04	-0.03	4.04
7,112.00	2.80	346.790	7,109.92	66.11	4.90	-54.62	2.30	1.95	-76.36
7,204.00	5.10	346.220	7,201.70	72.27	3.41	-60.69	2.50	2.50	-0.62
7,298.00	7.18	344.010	7,295.15	81.98	0.80	-70.39	2.23	2.21	-2.35
7,391.00	9.10	338.030	7,387.21	94.39	-3.56	-83.30	2.25	2.06	-6.43
7,484.00	11.12	332.420	7,478.77	109.16	-10.46	-99.54	2.41	2.17	-6.03
7,671.00	13.24	329.140	7,661.55	143.53	-29.80	-138.97	1.19	1.13	-1.75
7,764.00	13.39	331.270	7,752.05	162.12	-40.44	-160.39	0.55	0.16	2.29
7,857.00	13.57	331.230	7,842.49	181.12	-50.86	-182.06	0.19	0.19	-0.04
8,046.00	14.40	328.920	8,025.88	220.69	-73.67	-227.72	0.53	0.44	-1.22
8,140.00	14.15	332.420	8,116.98	240.88	-85.02	-250.89	0.96	-0.27	3.72
8,233.00	13.82	337.130	8,207.23	261.19	-94.60	-273.26	1.27	-0.35	5.06
8,327.00	14.50	338.130	8,298.37	282.46	-103.35	-296.03	0.77	0.72	1.06
8,420.00	14.66	336.890	8,388.38	304.09	-112.30	-319.23	0.38	0.17	-1.33
8,513.00	15.13	335.930	8,478.25	325.99	-121.87	-342.97	0.57	0.51	-1.03
8,606.00	15.50	334.720	8,567.95	348.31	-132.13	-367.41	0.53	0.40	-1.30
8,700.00	15.31	336.250	8,658.57	371.03	-142.49	-392.25	0.48	-0.20	1.63
8,794.00	14.29	337.690	8,749.45	393.12	-151.89	-416.07	1.15	-1.09	1.53
8,888.00	12.75	337.370	8,840.85	413.43	-160.29	-437.84	1.64	-1.64	-0.34
8,981.00	11.79	341.420	8,931.72	431.91	-167.27	-457.32	1.39	-1.03	4.35
9,075.00	12.73	338.610	9,023.58	450.65	-174.10	-476.96	1.18	1.00	-2.99
9,168.00	13.46	337.160	9,114.16	470.17	-182.04	-497.81	0.86	0.78	-1.56
9,262.00	14.33	337.120	9,205.41	490.97	-190.81	-520.20	0.93	0.93	-0.04
9,354.00	15.88	337.680	9,294.23	513.10	-200.02	-543.95	1.69	1.68	0.61
9,447.00	15.85	336.370	9,383.69	536.51	-209.94	-569.17	0.39	-0.03	-1.41
9,540.00	15.20	337.940	9,473.29	559.44	-219.61	-593.85	0.83	-0.70	1.69
9,634.00	14.64	338.880	9,564.12	581.95	-228.52	-617.77	0.65	-0.60	1.00
9,726.00	14.90	337.380	9,653.08	603.71	-237.26	-640.98	0.50	0.28	-1.63
9,819.00	16.26	337.670	9,742.66	626.79	-246.81	-665.72	1.46	1.46	0.31
9,913.00	15.66	337.630	9,833.04	650.70	-256.63	-691.32	0.64	-0.64	-0.04
10,006.00	14.28	336.170	9,922.88	672.80	-266.05	-715.15	1.54	-1.48	-1.57
10,100.00	13.08	335.480	10,014.21	693.08	-275.14	-737.25	1.29	-1.28	-0.73
10,193.00	11.51	335.770	10,105.08	711.12	-283.32	-756.95	1.69	-1.69	0.31



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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)
10,286.00	10.16	336.900	10,196.42	727.12	-290.35	-774.32	1.47	-1.45	1.22
10,379.00	9.21	334.960	10,288.09	741.41	-296.71	-789.87	1.08	-1.02	-2.09
10,472.00	7.65	337.770	10,380.08	753.88	-302.21	-803.41	1.73	-1.68	3.02
10,566.00	6.26	335.490	10,473.39	764.34	-306.70	-814.70	1.51	-1.48	-2.43
10,659.00	4.54	329.490	10,565.97	772.12	-310.67	-823.43	1.94	-1.85	-6.45
10,752.00	3.16	326.610	10,658.76	777.44	-313.95	-829.67	1.50	-1.48	-3.10
10,845.00	2.42	325.290	10,751.65	781.19	-316.48	-834.19	0.80	-0.80	-1.42
10,961.00	2.51	328.630	10,867.54	785.37	-319.20	-839.17	0.15	0.08	2.88
11,054.00	1.49	328.980	10,960.49	788.15	-320.88	-842.41	1.10	-1.10	0.38
Tie into original hole @ 11054 MD									
11,079.00	1.41	327.270	10,985.48	788.69	-321.21	-843.05	0.36	-0.32	-6.84
11,126.00	0.71	283.650	11,032.47	789.24	-321.81	-843.83	2.17	-1.49	-92.81
11,173.00	0.66	227.950	11,079.47	789.13	-322.29	-843.97	1.36	-0.11	-118.51
11,220.00	1.19	185.910	11,126.46	788.46	-322.55	-843.52	1.76	1.13	-89.45
11,265.00	1.41	181.810	11,171.45	787.44	-322.61	-842.68	0.53	0.49	-9.11
11,329.00	3.89	149.730	11,235.38	784.78	-321.54	-839.84	4.37	3.88	-50.13
11,376.00	9.19	147.260	11,282.06	780.24	-318.71	-834.49	11.29	11.28	-5.26
11,423.00	16.00	146.330	11,327.90	771.69	-313.08	-824.26	14.50	14.49	-1.98
11,471.00	20.33	149.550	11,373.50	758.99	-305.18	-809.31	9.26	9.02	6.71
11,518.00	22.76	153.030	11,417.21	743.84	-296.92	-792.07	5.84	5.17	7.40
11,565.00	25.54	151.840	11,460.09	726.80	-288.01	-772.86	6.00	5.91	-2.53
11,612.00	29.87	151.050	11,501.70	707.62	-277.56	-751.03	9.25	9.21	-1.68
11,659.00	33.94	150.340	11,541.59	685.97	-265.40	-726.20	8.70	8.66	-1.51
11,706.00	37.34	149.900	11,579.78	662.23	-251.75	-698.82	7.25	7.23	-0.94
11,752.00	39.86	148.890	11,615.73	637.53	-237.14	-670.12	5.65	5.48	-2.20
11,799.00	42.69	148.540	11,651.05	611.04	-221.04	-639.12	6.04	6.02	-0.74
11,844.00	45.07	148.540	11,683.48	584.44	-204.76	-607.94	5.29	5.29	0.00
11,891.00	47.95	149.200	11,715.82	555.25	-187.14	-573.85	6.21	6.13	1.40
11,937.00	50.60	149.510	11,745.83	525.26	-169.37	-538.99	5.78	5.76	0.67
11,984.00	52.98	149.370	11,774.90	493.46	-150.59	-502.07	5.07	5.06	-0.30
12,031.00	55.33	149.590	11,802.42	460.64	-131.25	-463.97	5.01	5.00	0.47
12,078.00	57.53	150.830	11,828.41	426.66	-111.80	-424.82	5.17	4.68	2.64
12,126.00	60.41	151.710	11,853.15	390.59	-92.03	-383.70	6.20	6.00	1.83
12,173.00	63.41	152.060	11,875.28	354.02	-72.50	-342.28	6.42	6.38	0.74
12,220.00	66.55	152.460	11,895.15	316.33	-52.68	-299.73	6.73	6.68	0.85
12,267.00	70.04	152.110	11,912.53	277.68	-32.37	-256.12	7.46	7.43	-0.74
12,314.00	72.65	152.020	11,927.57	238.34	-11.51	-211.63	5.56	5.55	-0.19
12,361.00	75.87	152.060	11,940.31	198.39	9.70	-166.43	6.85	6.85	0.09
12,408.00	80.03	152.190	11,950.12	157.77	31.18	-120.52	8.86	8.85	0.28
12,455.00	84.40	152.370	11,956.49	116.56	52.84	-74.01	9.31	9.30	0.38
12,503.00	88.42	152.280	11,959.49	74.14	75.08	-26.16	8.38	8.38	-0.19
12,597.00	88.56	151.890	11,961.97	-8.89	119.07	67.72	0.44	0.15	-0.41
12,691.00	89.17	151.670	11,963.83	-91.70	163.51	161.64	0.69	0.65	-0.23
12,785.00	89.22	149.460	11,965.15	-173.56	209.70	255.62	2.35	0.05	-2.35

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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)
12,880.00	89.13	149.070	11,966.52	-255.20	258.25	350.61	0.42	-0.09	-0.41
12,974.00	89.17	149.420	11,967.92	-335.98	306.31	444.59	0.37	0.04	0.37
13,068.00	89.13	148.580	11,969.31	-416.54	354.72	538.57	0.89	-0.04	-0.89
13,162.00	89.13	148.930	11,970.74	-496.90	403.47	632.55	0.37	0.00	0.37
13,256.00	89.17	148.620	11,972.13	-577.27	452.19	726.53	0.33	0.04	-0.33
13,350.00	89.22	150.040	11,973.45	-658.11	500.14	820.51	1.51	0.05	1.51
13,444.00	89.13	149.810	11,974.81	-739.45	547.24	914.50	0.26	-0.10	-0.24
13,538.00	89.13	150.520	11,976.23	-820.98	594.00	1,008.49	0.76	0.00	0.76
13,632.00	89.09	150.210	11,977.69	-902.67	640.47	1,102.47	0.33	-0.04	-0.33
13,726.00	89.13	149.510	11,979.15	-983.95	687.67	1,196.46	0.75	0.04	-0.74
13,820.00	89.22	149.730	11,980.51	-1,065.04	735.20	1,290.45	0.25	0.10	0.23
13,914.00	89.09	149.070	11,981.89	-1,145.94	783.04	1,384.44	0.72	-0.14	-0.70
14,008.00	89.13	149.860	11,983.35	-1,226.89	830.80	1,478.42	0.84	0.04	0.84
14,102.00	89.13	149.510	11,984.78	-1,308.03	878.24	1,572.41	0.37	0.00	-0.37
14,197.00	89.17	149.590	11,986.19	-1,389.92	926.38	1,667.40	0.09	0.04	0.08
14,291.00	89.17	149.550	11,987.55	-1,470.96	973.98	1,761.39	0.04	0.00	-0.04
14,387.00	89.26	149.730	11,988.87	-1,553.79	1,022.50	1,857.38	0.21	0.09	0.19
14,480.00	89.22	150.650	11,990.10	-1,634.47	1,068.73	1,950.37	0.99	-0.04	0.99
14,574.00	89.26	149.460	11,991.35	-1,715.92	1,115.64	2,044.36	1.27	0.04	-1.27
14,667.00	89.22	151.140	11,992.58	-1,796.69	1,161.71	2,137.34	1.81	-0.04	1.81
14,760.00	89.13	150.870	11,993.92	-1,878.03	1,206.79	2,230.31	0.31	-0.10	-0.29
14,853.00	89.22	150.700	11,995.26	-1,959.19	1,252.18	2,323.28	0.21	0.10	-0.18
14,946.00	89.17	151.180	11,996.57	-2,040.47	1,297.35	2,416.25	0.52	-0.05	0.52
15,039.00	89.17	151.090	11,997.91	-2,121.91	1,342.24	2,509.21	0.10	0.00	-0.10
15,133.00	89.13	151.140	11,999.31	-2,204.20	1,387.64	2,603.17	0.07	-0.04	0.05
15,227.00	89.26	151.310	12,000.63	-2,286.59	1,432.88	2,697.13	0.23	0.14	0.18
15,320.00	89.13	151.050	12,001.94	-2,368.06	1,477.71	2,790.09	0.31	-0.14	-0.28
15,413.00	89.22	151.090	12,003.27	-2,449.45	1,522.69	2,883.06	0.11	0.10	0.04
15,506.00	89.09	150.560	12,004.65	-2,530.64	1,568.02	2,976.03	0.59	-0.14	-0.57
15,598.00	89.09	150.780	12,006.11	-2,610.84	1,613.08	3,068.01	0.24	0.00	0.24
15,691.00	89.17	150.870	12,007.52	-2,692.03	1,658.41	3,160.98	0.13	0.09	0.10
15,784.00	89.17	151.000	12,008.87	-2,773.31	1,703.59	3,253.95	0.14	0.00	0.14
15,878.00	89.13	150.080	12,010.26	-2,855.14	1,749.81	3,347.93	0.98	-0.04	-0.98
15,971.00	89.17	150.120	12,011.64	-2,935.76	1,796.17	3,440.91	0.06	0.04	0.04
16,065.00	89.26	150.520	12,012.93	-3,017.42	1,842.71	3,534.90	0.44	0.10	0.43
16,158.00	89.17	150.080	12,014.20	-3,098.19	1,888.78	3,627.89	0.48	-0.10	-0.47
16,252.00	89.09	150.340	12,015.63	-3,179.76	1,935.48	3,721.87	0.29	-0.09	0.28
16,346.00	89.17	153.650	12,017.06	-3,262.73	1,979.60	3,815.77	3.52	0.09	3.52
16,439.00	89.17	147.700	12,018.41	-3,343.77	2,025.13	3,908.71	6.40	0.00	-6.40
16,533.00	89.26	148.450	12,019.69	-3,423.54	2,074.83	4,002.66	0.80	0.10	0.80
Survey @ 16533.00 MD 12019.69 TVD									
16,646.00	89.26	148.450	12,021.15	-3,519.83	2,133.95	4,115.62	0.00	0.00	0.00
Survey Proj. to 16646.00 MD 12021.15 TVD									

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,054.00	10,960.49	788.15	-320.88	Tie into original hole @ 11054 MD
16,533.00	12,019.69	-3,423.54	2,074.83	Survey @ 16533.00 MD 12019.69 TVD
16,646.00	12,021.15	-3,519.83	2,133.95	Survey Proj. to 16646.00 MD 12021.15 TVD



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

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-20 HU (slot T)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,141.688 usft	Latitude:	39.830253590
	+E/-W	0.00 ft	Easting:	1,745,255.228 usft	Longitude:	-80.626568190
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,370.00 ft

Wellbore	Sidetrack 01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	6/15/2022	-8.72	66.46	51,656.37798156

Design	Surveys Sidetrack 01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	11,054.00
Vertical Section:		Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
		0.00	0.00	0.00	149.718

Survey Program	Date 10/21/2022				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
214.50	1,163.50	MWD surf (Original Hole)	MWD	MWD - Standard	
1,211.50	2,993.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,045.50	5,859.50	MWD 3045.5-5859.5 MD (Original Hole)	MWD	MWD - Standard	
5,900.00	10,845.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
10,961.00	11,054.00	MWD (Original Hole)	MWD	MWD - Standard	
11,079.00	16,533.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard	
16,561.00	16,646.00	Projection ST1 (Sidetrack 01)	MWD	MWD - Standard	

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	0.000	0.00	0.00	0.00	14,465,141.688	1,745,255.228	39.830253590	-80.626568190	
214.50	0.18	144.480	214.50	-0.27	0.20	14,465,141.414	1,745,255.424	39.830252835	-80.626567497	
245.50	0.11	42.990	245.50	-0.29	0.24	14,465,141.396	1,745,255.473	39.830252786	-80.626567324	
273.50	0.17	46.490	273.50	-0.24	0.29	14,465,141.444	1,745,255.521	39.830252917	-80.626567151	
302.50	0.15	48.000	302.50	-0.19	0.35	14,465,141.499	1,745,255.580	39.830253068	-80.626566939	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
330.50	0.17	23.310	330.50	-0.13	0.40	14,465,141.562	1,745,255.624	39.830253240	-80.626566782	
362.50	0.21	324.750	362.50	-0.03	0.38	14,465,141.653	1,745,255.609	39.830253491	-80.626566834	
394.50	0.26	8.330	394.50	0.09	0.36	14,465,141.773	1,745,255.586	39.830253820	-80.626566916	
424.50	0.30	349.160	424.50	0.23	0.35	14,465,141.918	1,745,255.581	39.830254217	-80.626566931	
456.50	0.12	123.870	456.50	0.29	0.36	14,465,141.981	1,745,255.593	39.830254391	-80.626566887	
488.50	0.23	357.560	488.50	0.34	0.39	14,465,142.027	1,745,255.618	39.830254516	-80.626566797	
520.50	0.34	326.270	520.50	0.48	0.33	14,465,142.170	1,745,255.563	39.830254910	-80.626566992	
551.50	0.34	33.400	551.50	0.64	0.33	14,465,142.323	1,745,255.562	39.830255331	-80.626566992	
583.50	0.54	12.590	583.50	0.86	0.42	14,465,142.550	1,745,255.647	39.830255952	-80.626566685	
615.50	0.62	357.490	615.49	1.18	0.44	14,465,142.870	1,745,255.672	39.830256830	-80.626566590	
647.50	0.74	338.480	647.49	1.55	0.36	14,465,143.235	1,745,255.589	39.830257834	-80.626566882	
678.50	0.67	358.780	678.49	1.91	0.28	14,465,143.602	1,745,255.512	39.830258844	-80.626567152	
710.50	1.01	347.910	710.49	2.38	0.22	14,465,144.065	1,745,255.449	39.830260116	-80.626567389	
742.50	0.93	2.950	742.48	2.91	0.17	14,465,144.600	1,745,255.403	39.830261586	-80.626567524	
773.50	1.44	355.180	773.48	3.55	0.16	14,465,145.240	1,745,255.383	39.830263342	-80.626567585	
805.50	0.79	6.060	805.47	4.17	0.14	14,465,145.860	1,745,255.373	39.830265045	-80.626567613	
837.50	0.60	7.450	837.47	4.56	0.19	14,465,146.245	1,745,255.418	39.830266103	-80.626567447	
869.50	0.12	329.430	869.47	4.75	0.19	14,465,146.440	1,745,255.422	39.830266639	-80.626567428	
901.50	0.19	37.620	901.47	4.82	0.21	14,465,146.511	1,745,255.438	39.830266833	-80.626567372	
932.50	0.17	36.980	932.47	4.90	0.27	14,465,146.589	1,745,255.497	39.830267045	-80.626567161	
964.50	0.22	7.580	964.47	5.00	0.31	14,465,146.687	1,745,255.534	39.830267316	-80.626567029	
996.50	0.41	25.830	996.47	5.16	0.36	14,465,146.851	1,745,255.592	39.830267766	-80.626566820	
1,059.50	0.64	6.830	1,059.46	5.72	0.50	14,465,147.404	1,745,255.732	39.830269281	-80.626566312	
1,122.50	0.73	8.380	1,122.46	6.46	0.60	14,465,148.150	1,745,255.832	39.830271329	-80.626565944	
1,163.50	0.79	31.650	1,163.45	6.96	0.79	14,465,148.649	1,745,256.018	39.830272698	-80.626565273	
1,211.50	0.52	33.930	1,211.45	7.42	1.09	14,465,149.111	1,745,256.313	39.830273964	-80.626564214	
1,243.50	0.62	21.970	1,243.45	7.70	1.23	14,465,149.392	1,745,256.459	39.830274734	-80.626563691	
1,274.50	0.74	25.790	1,274.45	8.04	1.38	14,465,149.728	1,745,256.609	39.830275655	-80.626563152	
1,306.50	1.01	35.520	1,306.44	8.46	1.63	14,465,150.144	1,745,256.863	39.830276793	-80.626562242	
1,337.50	1.10	39.950	1,337.44	8.91	1.98	14,465,150.594	1,745,257.213	39.830278026	-80.626560989	
1,369.50	1.36	40.050	1,369.43	9.43	2.43	14,465,151.120	1,745,257.654	39.830279466	-80.626559409	
1,401.50	1.53	36.310	1,401.42	10.07	2.92	14,465,151.755	1,745,258.152	39.830281204	-80.626557628	
1,432.50	1.39	43.730	1,432.41	10.67	3.43	14,465,152.361	1,745,258.657	39.830282860	-80.626555820	
1,464.50	1.28	48.980	1,464.40	11.19	3.97	14,465,152.876	1,745,259.195	39.830284268	-80.626553896	
1,495.50	1.15	39.980	1,495.40	11.65	4.43	14,465,153.341	1,745,259.656	39.830285542	-80.626552247	
1,527.50	0.89	48.800	1,527.39	12.06	4.82	14,465,153.751	1,745,260.049	39.830286663	-80.626550840	
1,558.50	0.60	65.620	1,558.39	12.29	5.15	14,465,153.977	1,745,260.378	39.830287278	-80.626549665	
1,590.50	0.31	113.070	1,590.39	12.32	5.38	14,465,154.012	1,745,260.610	39.830287372	-80.626548837	
1,622.50	0.43	151.830	1,622.39	12.18	5.52	14,465,153.872	1,745,260.747	39.830286987	-80.626548353	
1,654.50	0.38	155.370	1,654.39	11.98	5.62	14,465,153.670	1,745,260.847	39.830286430	-80.626547997	
1,686.50	0.39	194.190	1,686.38	11.78	5.64	14,465,153.468	1,745,260.865	39.830285875	-80.626547937	
1,717.50	0.31	213.680	1,717.38	11.61	5.56	14,465,153.296	1,745,260.793	39.830285404	-80.626548198	
1,749.50	0.24	248.360	1,749.38	11.51	5.45	14,465,153.199	1,745,260.682	39.830285139	-80.626548592	
1,780.50	0.28	269.990	1,780.38	11.49	5.32	14,465,153.175	1,745,260.546	39.830285075	-80.626549077	
1,812.50	0.36	280.910	1,812.38	11.51	5.14	14,465,153.194	1,745,260.369	39.830285129	-80.626549707	
1,843.50	0.51	291.250	1,843.38	11.57	4.92	14,465,153.262	1,745,260.145	39.830285320	-80.626550505	
1,875.50	0.62	283.160	1,875.38	11.67	4.62	14,465,153.353	1,745,259.844	39.830285573	-80.626551577	
1,907.50	0.81	284.580	1,907.38	11.76	4.23	14,465,153.450	1,745,259.456	39.830285842	-80.626552955	
1,939.50	0.98	280.910	1,939.37	11.87	3.74	14,465,153.558	1,745,258.969	39.830286146	-80.626554691	
1,970.50	0.89	262.320	1,970.37	11.89	3.24	14,465,153.576	1,745,258.470	39.830286201	-80.626556467	
2,001.50	1.10	239.570	2,001.37	11.71	2.75	14,465,153.394	1,745,257.975	39.830285705	-80.626558234	
2,033.50	1.50	223.000	2,033.36	11.24	2.20	14,465,152.932	1,745,257.424	39.830284443	-80.626560202	
2,064.50	1.50	215.090	2,064.35	10.61	1.69	14,465,152.303	1,745,256.914	39.830282722	-80.626562027	
2,096.50	1.52	209.520	2,096.34	9.90	1.24	14,465,151.591	1,745,256.464	39.830280772	-80.626563640	



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
2,128.50	1.03	203.490	2,128.33	9.27	0.91	14,465,150.958	1,745,256.141	39.830279037	-80.626564803	
2,159.50	1.07	180.260	2,159.32	8.72	0.80	14,465,150.413	1,745,256.028	39.830277541	-80.626565211	
2,191.50	0.93	173.210	2,191.32	8.17	0.83	14,465,149.856	1,745,256.057	39.830276012	-80.626565115	
2,222.50	0.97	162.010	2,222.31	7.67	0.94	14,465,149.357	1,745,256.168	39.830274640	-80.626564728	
2,254.50	1.09	150.510	2,254.31	7.15	1.17	14,465,148.834	1,745,256.402	39.830273202	-80.626563904	
2,286.50	1.22	146.800	2,286.30	6.60	1.51	14,465,148.284	1,745,256.738	39.830271688	-80.626562714	
2,317.50	1.20	146.030	2,317.30	6.05	1.87	14,465,147.739	1,745,257.100	39.830270186	-80.626561433	
2,349.50	1.21	134.630	2,349.29	5.54	2.30	14,465,147.224	1,745,257.528	39.830268766	-80.626559917	
2,381.50	1.08	143.300	2,381.28	5.06	2.72	14,465,146.745	1,745,257.949	39.830267445	-80.626558426	
2,413.50	1.22	123.810	2,413.28	4.63	3.18	14,465,146.313	1,745,258.412	39.830266256	-80.626556782	
2,444.50	1.03	131.480	2,444.27	4.26	3.67	14,465,145.945	1,745,258.895	39.830265239	-80.626555067	
2,476.50	0.92	122.970	2,476.26	3.93	4.10	14,465,145.615	1,745,259.326	39.830264327	-80.626553537	
2,507.50	0.75	129.890	2,507.26	3.66	4.46	14,465,145.349	1,745,259.690	39.830263593	-80.626552243	
2,539.50	0.68	122.750	2,539.26	3.42	4.78	14,465,145.112	1,745,260.011	39.830262939	-80.626551105	
2,571.50	0.48	131.890	2,571.26	3.23	5.04	14,465,144.920	1,745,260.270	39.830262408	-80.626550183	
2,602.50	0.17	170.870	2,602.26	3.10	5.15	14,465,144.788	1,745,260.374	39.830262044	-80.626549815	
2,634.50	0.15	190.710	2,634.26	3.01	5.15	14,465,144.700	1,745,260.374	39.830261802	-80.626549817	
2,665.50	0.29	274.630	2,665.26	2.98	5.06	14,465,144.666	1,745,260.288	39.830261711	-80.626550123	
2,697.50	0.44	312.420	2,697.26	3.07	4.89	14,465,144.756	1,745,260.117	39.830261959	-80.626550732	
2,729.50	0.57	312.980	2,729.25	3.26	4.68	14,465,144.947	1,745,259.910	39.830262487	-80.626551467	
2,759.50	0.53	311.700	2,759.25	3.45	4.47	14,465,145.141	1,745,259.697	39.830263022	-80.626552222	
2,791.50	0.80	311.720	2,791.25	3.70	4.19	14,465,145.388	1,745,259.420	39.830263704	-80.626553206	
2,823.50	0.85	332.480	2,823.25	4.06	3.91	14,465,145.747	1,745,259.143	39.830264693	-80.626554186	
2,855.50	0.91	335.690	2,855.24	4.50	3.70	14,465,146.189	1,745,258.929	39.830265910	-80.626554942	
2,886.50	0.97	338.030	2,886.24	4.97	3.50	14,465,146.657	1,745,258.729	39.830267196	-80.626555646	
2,918.50	1.05	340.100	2,918.23	5.50	3.30	14,465,147.184	1,745,258.528	39.830268646	-80.626556354	
2,950.50	1.17	340.140	2,950.23	6.08	3.09	14,465,147.767	1,745,258.317	39.830270249	-80.626557097	
2,993.50	1.58	348.010	2,993.22	7.07	2.82	14,465,148.760	1,745,258.045	39.830272978	-80.626558052	
3,045.50	1.89	345.820	3,045.19	8.60	2.46	14,465,150.292	1,745,257.686	39.830277191	-80.626559308	
3,077.50	2.08	352.290	3,077.17	9.69	2.25	14,465,151.379	1,745,257.479	39.830280179	-80.626560029	
3,109.50	1.85	355.260	3,109.15	10.78	2.13	14,465,152.470	1,745,257.358	39.830283175	-80.626560443	
3,141.50	1.09	357.630	3,141.14	11.60	2.07	14,465,153.289	1,745,257.303	39.830285424	-80.626560627	
3,172.50	0.23	350.750	3,172.14	11.96	2.05	14,465,153.645	1,745,257.281	39.830286402	-80.626560701	
3,204.50	0.32	179.780	3,204.14	11.93	2.04	14,465,153.619	1,745,257.271	39.830286331	-80.626560737	
3,236.50	0.63	182.360	3,236.14	11.67	2.04	14,465,153.353	1,745,257.264	39.830285603	-80.626560766	
3,268.50	0.88	185.620	3,268.14	11.25	2.00	14,465,152.933	1,745,257.233	39.830284449	-80.626560883	
3,300.50	1.04	192.190	3,300.13	10.72	1.92	14,465,152.405	1,745,257.147	39.830282999	-80.626561195	
3,331.50	1.13	190.980	3,331.13	10.14	1.80	14,465,151.830	1,745,257.030	39.830281421	-80.626561623	
3,363.50	1.23	195.200	3,363.12	9.50	1.65	14,465,151.188	1,745,256.880	39.830279662	-80.626562167	
3,394.50	1.28	196.440	3,394.11	8.85	1.47	14,465,150.535	1,745,256.694	39.830277870	-80.626562837	
3,426.50	1.25	198.600	3,426.11	8.17	1.25	14,465,149.862	1,745,256.482	39.830276023	-80.626563604	
3,457.50	1.20	198.520	3,457.10	7.55	1.04	14,465,149.233	1,745,256.271	39.830274300	-80.626564364	
3,489.50	1.22	200.580	3,489.09	6.91	0.82	14,465,148.597	1,745,256.045	39.830272554	-80.626565179	
3,521.50	1.14	200.710	3,521.08	6.29	0.58	14,465,147.980	1,745,255.812	39.830270863	-80.626566016	
3,552.50	0.53	213.600	3,552.08	5.88	0.40	14,465,147.572	1,745,255.624	39.830269745	-80.626566693	
3,584.50	0.66	340.960	3,584.08	5.94	0.25	14,465,147.623	1,745,255.482	39.830269887	-80.626567198	
3,615.50	1.42	359.750	3,615.07	6.49	0.19	14,465,148.176	1,745,255.422	39.830271406	-80.626567404	
3,647.50	1.87	343.000	3,647.06	7.41	0.22	14,465,149.094	1,745,255.452	39.830273925	-80.626567285	
3,679.50	2.29	5.610	3,679.04	8.56	0.32	14,465,150.251	1,745,255.545	39.830277103	-80.626566934	
3,710.50	2.53	8.030	3,710.01	9.86	0.47	14,465,151.545	1,745,255.701	39.830280654	-80.626566358	
3,742.50	2.71	7.900	3,741.98	11.31	0.68	14,465,152.994	1,745,255.904	39.830284630	-80.626565615	
3,773.50	2.79	7.890	3,772.94	12.78	0.88	14,465,154.467	1,745,256.108	39.830288674	-80.626564866	
3,804.50	2.42	11.230	3,803.91	14.17	1.11	14,465,155.856	1,745,256.339	39.830292486	-80.626564022	
3,835.50	1.71	7.580	3,834.89	15.27	1.30	14,465,156.957	1,745,256.528	39.830295506	-80.626563334	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,867.50	1.45	5.790	3,866.88	16.14	1.40	14,465,157.833	1,745,256.632	39.830297911	-80.626562951
3,899.50	1.38	4.290	3,898.87	16.93	1.47	14,465,158.620	1,745,256.701	39.830300072	-80.626562692
3,929.50	1.38	4.050	3,928.86	17.65	1.53	14,465,159.340	1,745,256.754	39.830302050	-80.626562494
3,961.50	1.39	0.040	3,960.85	18.42	1.55	14,465,160.113	1,745,256.781	39.830304171	-80.626562384
3,993.50	1.61	359.180	3,992.84	19.26	1.55	14,465,160.950	1,745,256.775	39.830306471	-80.626562394
4,024.50	1.63	359.260	4,023.83	20.14	1.54	14,465,161.827	1,745,256.763	39.830308878	-80.626562423
4,055.50	1.93	358.010	4,054.81	21.10	1.51	14,465,162.789	1,745,256.739	39.830311522	-80.626562494
4,087.50	2.42	359.120	4,086.79	22.32	1.48	14,465,164.003	1,745,256.710	39.830314856	-80.626562579
4,119.50	2.90	0.700	4,118.76	23.80	1.48	14,465,165.488	1,745,256.710	39.830318934	-80.626562559
4,150.50	3.28	359.930	4,149.71	25.47	1.49	14,465,167.159	1,745,256.718	39.830323523	-80.626562504
4,182.50	3.55	1.370	4,181.65	27.38	1.51	14,465,169.065	1,745,256.741	39.830328757	-80.626562395
4,213.50	3.83	0.380	4,212.59	29.37	1.54	14,465,171.060	1,745,256.771	39.830334234	-80.626562259
4,245.50	3.69	354.860	4,244.52	31.47	1.46	14,465,173.154	1,745,256.686	39.830339987	-80.626562532
4,277.50	3.12	349.750	4,276.46	33.35	1.21	14,465,175.037	1,745,256.438	39.830345159	-80.626563384
4,308.50	3.01	345.340	4,307.42	34.97	0.85	14,465,176.654	1,745,256.082	39.830349606	-80.626564628
4,340.50	3.19	345.700	4,339.37	36.64	0.42	14,465,178.330	1,745,255.650	39.830354212	-80.626566144
4,372.50	3.44	344.280	4,371.32	38.43	-0.06	14,465,180.117	1,745,255.170	39.830359125	-80.626567827
4,404.50	3.74	347.030	4,403.26	40.37	-0.55	14,465,182.058	1,745,254.675	39.830364462	-80.626569559
4,435.50	3.67	348.160	4,434.19	42.33	-0.98	14,465,184.014	1,745,254.245	39.830369839	-80.626571064
4,467.50	3.37	352.760	4,466.13	44.26	-1.31	14,465,185.950	1,745,253.916	39.830375158	-80.626572206
4,498.50	3.22	357.070	4,497.08	46.04	-1.47	14,465,187.723	1,745,253.757	39.830380030	-80.626572747
4,530.50	3.26	359.980	4,529.03	47.84	-1.52	14,465,189.531	1,745,253.711	39.830384994	-80.626572885
4,562.50	3.48	1.430	4,560.97	49.72	-1.49	14,465,191.411	1,745,253.734	39.830390158	-80.626572772
4,594.50	3.78	1.510	4,592.91	51.75	-1.44	14,465,193.437	1,745,253.787	39.830395720	-80.626572556
4,626.50	3.59	4.890	4,624.84	53.80	-1.33	14,465,195.489	1,745,253.900	39.830401356	-80.626572122
4,658.50	3.01	5.330	4,656.79	55.64	-1.17	14,465,197.324	1,745,254.063	39.830406392	-80.626571513
4,689.50	2.97	7.670	4,687.75	57.24	-0.98	14,465,198.930	1,745,254.246	39.830410802	-80.626570838
4,721.50	2.78	10.870	4,719.71	58.83	-0.73	14,465,200.514	1,745,254.503	39.830415148	-80.626569899
4,753.50	2.15	16.380	4,751.68	60.16	-0.41	14,465,201.852	1,745,254.819	39.830418819	-80.626568755
4,785.50	1.77	15.560	4,783.66	61.22	-0.11	14,465,202.904	1,745,255.120	39.830421704	-80.626567664
4,816.50	1.24	11.610	4,814.65	62.01	0.09	14,465,203.694	1,745,255.316	39.830423871	-80.626566954
4,848.50	1.12	7.270	4,846.64	62.66	0.20	14,465,204.343	1,745,255.426	39.830425653	-80.626566556
4,879.50	1.18	358.340	4,877.64	63.27	0.22	14,465,204.962	1,745,255.444	39.830427353	-80.626566482
4,911.50	1.17	356.950	4,909.63	63.93	0.18	14,465,205.617	1,745,255.405	39.830429152	-80.626566610
4,943.50	0.79	347.870	4,941.62	64.47	0.11	14,465,206.159	1,745,255.341	39.830430641	-80.626566829
4,975.50	0.50	323.980	4,973.62	64.80	-0.02	14,465,206.488	1,745,255.213	39.830431545	-80.626567281
5,007.50	0.31	292.790	5,005.62	64.95	-0.18	14,465,206.634	1,745,255.051	39.830431949	-80.626567856
5,039.50	0.35	271.860	5,037.62	64.98	-0.35	14,465,206.671	1,745,254.874	39.830432052	-80.626568487
5,070.50	0.44	256.300	5,068.62	64.96	-0.56	14,465,206.646	1,745,254.663	39.830431985	-80.626569237
5,102.50	0.41	246.630	5,100.62	64.88	-0.79	14,465,206.571	1,745,254.439	39.830431783	-80.626570037
5,133.50	0.51	250.410	5,131.62	64.79	-1.02	14,465,206.481	1,745,254.207	39.830431538	-80.626570864
5,165.50	0.64	236.450	5,163.62	64.65	-1.30	14,465,206.335	1,745,253.924	39.830431139	-80.626571875
5,197.50	0.62	234.560	5,195.61	64.45	-1.59	14,465,206.135	1,745,253.634	39.830430595	-80.626572911
5,228.50	0.67	241.610	5,226.61	64.26	-1.89	14,465,205.952	1,745,253.338	39.830430095	-80.626573968
5,260.50	0.72	233.490	5,258.61	64.06	-2.22	14,465,205.743	1,745,253.012	39.830429526	-80.626575133
5,292.50	0.91	238.670	5,290.61	63.80	-2.60	14,465,205.492	1,745,252.633	39.830428839	-80.626576486
5,323.50	0.98	241.220	5,321.60	63.55	-3.04	14,465,205.236	1,745,252.190	39.830428142	-80.626578066
5,355.50	0.80	236.240	5,353.60	63.29	-3.46	14,465,204.980	1,745,251.765	39.830427444	-80.626579586
5,385.50	0.67	237.340	5,383.60	63.08	-3.79	14,465,204.769	1,745,251.443	39.830426868	-80.626580735
5,417.50	0.49	237.170	5,415.59	62.91	-4.06	14,465,204.594	1,745,251.170	39.830426390	-80.626581708
5,449.50	0.15	237.480	5,447.59	62.81	-4.21	14,465,204.497	1,745,251.020	39.830426126	-80.626582245
5,480.50	0.18	193.630	5,478.59	62.74	-4.25	14,465,204.428	1,745,250.974	39.830425937	-80.626582409
5,512.50	0.20	222.210	5,510.59	62.65	-4.30	14,465,204.338	1,745,250.925	39.830425690	-80.626582586
5,544.50	0.11	173.810	5,542.59	62.58	-4.34	14,465,204.266	1,745,250.891	39.830425493	-80.626582709



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,575.50	0.41	99.140	5,573.59	62.53	-4.22	14,465,204.219	1,745,251.004	39.830425362	-80.626582308
5,607.50	0.68	96.440	5,605.59	62.49	-3.92	14,465,204.179	1,745,251.305	39.830425250	-80.626581234
5,638.50	0.74	87.960	5,636.59	62.48	-3.54	14,465,204.166	1,745,251.688	39.830425209	-80.626579871
5,670.50	1.04	88.250	5,668.59	62.49	-3.04	14,465,204.182	1,745,252.185	39.830425247	-80.626578101
5,701.50	1.15	83.970	5,699.58	62.54	-2.45	14,465,204.223	1,745,252.775	39.830425354	-80.626575997
5,733.50	1.05	91.950	5,731.57	62.56	-1.84	14,465,204.247	1,745,253.388	39.830425412	-80.626573815
5,764.50	0.81	95.870	5,762.57	62.53	-1.34	14,465,204.215	1,745,253.890	39.830425318	-80.626572028
5,796.50	0.76	95.680	5,794.57	62.48	-0.90	14,465,204.171	1,745,254.326	39.830425192	-80.626570475
5,827.50	0.81	95.290	5,825.56	62.44	-0.48	14,465,204.130	1,745,254.749	39.830425076	-80.626568970
5,859.50	0.82	92.340	5,857.56	62.41	-0.03	14,465,204.100	1,745,255.203	39.830424988	-80.626567353
5,900.00	0.78	88.260	5,898.06	62.41	0.54	14,465,204.097	1,745,255.768	39.830424972	-80.626565340
5,993.00	1.09	103.030	5,991.04	62.23	2.03	14,465,203.916	1,745,257.262	39.830424460	-80.626560020
6,087.00	1.31	107.900	6,085.02	61.70	3.93	14,465,203.385	1,745,259.156	39.830422978	-80.626553283
6,180.00	0.77	96.060	6,178.01	61.30	5.56	14,465,202.992	1,745,260.789	39.830421880	-80.626547472
6,273.00	0.68	69.030	6,271.00	61.44	6.70	14,465,203.123	1,745,261.926	39.830422228	-80.626543421
6,367.00	0.25	266.430	6,365.00	61.62	7.01	14,465,203.310	1,745,262.242	39.830422738	-80.626542292
6,460.00	0.73	281.310	6,458.00	61.73	6.23	14,465,203.414	1,745,261.458	39.830423031	-80.626545081
6,553.00	1.11	285.130	6,550.98	62.08	4.78	14,465,203.765	1,745,260.008	39.830424013	-80.626550243
6,646.00	0.33	316.660	6,643.98	62.51	3.73	14,465,204.195	1,745,258.954	39.830425205	-80.626553988
6,739.00	0.15	69.150	6,736.98	62.75	3.66	14,465,204.433	1,745,258.884	39.830425860	-80.626554234
6,833.00	0.43	75.220	6,830.97	62.88	4.11	14,465,204.567	1,745,259.340	39.830426222	-80.626552608
6,988.00	0.38	81.480	6,985.97	63.10	5.18	14,465,204.791	1,745,260.411	39.830426827	-80.626548791
7,112.00	2.80	346.790	7,109.92	66.11	4.90	14,465,207.802	1,745,260.126	39.830435096	-80.626549763
7,204.00	5.10	346.220	7,201.70	72.27	3.41	14,465,213.961	1,745,258.638	39.830452030	-80.626554971
7,298.00	7.18	344.010	7,295.15	81.98	0.80	14,465,223.667	1,745,256.024	39.830478714	-80.626564136
7,391.00	9.10	338.030	7,387.21	94.39	-3.56	14,465,236.076	1,745,251.671	39.830512841	-80.626579456
7,484.00	11.12	332.420	7,478.77	109.16	-10.46	14,465,250.847	1,745,244.767	39.830553485	-80.626603830
7,671.00	13.24	329.140	7,661.55	143.53	-29.80	14,465,285.218	1,745,225.431	39.830648096	-80.626672191
7,764.00	13.39	331.270	7,752.05	162.12	-40.44	14,465,303.803	1,745,214.792	39.830699256	-80.626709810
7,857.00	13.57	331.230	7,842.49	181.12	-50.86	14,465,322.809	1,745,204.365	39.830751571	-80.626746668
8,046.00	14.40	328.920	8,025.88	220.69	-73.67	14,465,362.373	1,745,181.561	39.830860484	-80.626827308
8,140.00	14.15	332.420	8,116.98	240.88	-85.02	14,465,382.568	1,745,170.207	39.830916074	-80.626867449
8,233.00	13.82	337.130	8,207.23	261.19	-94.60	14,465,402.879	1,745,160.627	39.830971962	-80.626901271
8,327.00	14.50	338.130	8,298.37	282.46	-103.35	14,465,424.145	1,745,151.880	39.831030462	-80.626932111
8,420.00	14.66	336.890	8,388.38	304.09	-112.30	14,465,445.773	1,745,142.924	39.831089960	-80.626963691
8,513.00	15.13	335.930	8,478.25	325.99	-121.87	14,465,467.679	1,745,133.355	39.831150228	-80.626997450
8,606.00	15.50	334.720	8,567.95	348.31	-132.13	14,465,489.997	1,745,123.098	39.831211636	-80.627033653
8,700.00	15.31	336.250	8,658.57	371.03	-142.49	14,465,512.714	1,745,112.736	39.831274139	-80.627070224
8,794.00	14.29	337.690	8,749.45	393.12	-151.89	14,465,534.806	1,745,103.334	39.831334916	-80.627103386
8,888.00	12.75	337.370	8,840.85	413.43	-160.29	14,465,555.114	1,745,094.938	39.831390782	-80.627132990
8,981.00	11.79	341.420	8,931.72	431.91	-167.27	14,465,573.593	1,745,087.962	39.831441609	-80.627157565
9,075.00	12.73	338.610	9,023.58	450.65	-174.10	14,465,592.340	1,745,081.124	39.831493170	-80.627181641
9,168.00	13.46	337.160	9,114.16	470.17	-182.04	14,465,611.856	1,745,073.186	39.831546856	-80.627209628
9,262.00	14.33	337.120	9,205.41	490.97	-190.81	14,465,632.656	1,745,064.416	39.831604078	-80.627240556
9,354.00	15.88	337.680	9,294.23	513.10	-200.02	14,465,654.790	1,745,055.209	39.831664970	-80.627273023
9,447.00	15.85	336.370	9,383.69	536.51	-209.94	14,465,678.196	1,745,045.286	39.831729360	-80.627308020
9,540.00	15.20	337.940	9,473.29	559.44	-219.61	14,465,701.130	1,745,035.617	39.831792454	-80.627342123
9,634.00	14.64	338.880	9,564.12	581.95	-228.52	14,465,723.632	1,745,026.708	39.831854351	-80.627373521
9,726.00	14.90	337.380	9,653.08	603.71	-237.26	14,465,745.396	1,745,017.970	39.831914219	-80.627404325
9,819.00	16.26	337.670	9,742.66	626.79	-246.81	14,465,768.478	1,745,008.424	39.831977715	-80.627437985
9,913.00	15.66	337.630	9,833.04	650.70	-256.63	14,465,792.383	1,744,998.595	39.832043476	-80.627472639
10,006.00	14.28	336.170	9,922.88	672.80	-266.05	14,465,814.483	1,744,989.184	39.832104275	-80.627505835
10,100.00	13.08	335.480	10,014.21	693.08	-275.14	14,465,834.766	1,744,980.085	39.832160080	-80.627537943
10,193.00	11.51	335.770	10,105.08	711.12	-283.32	14,465,852.802	1,744,971.909	39.832209706	-80.627566797



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wallbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,286.00	10.16	336.900	10,196.42	727.12	-290.35	14,465,868.809	1,744,964.883	39.832253744	-80.627591588
10,379.00	9.21	334.960	10,288.09	741.41	-296.71	14,465,883.097	1,744,958.515	39.832293056	-80.627614060
10,472.00	7.65	337.770	10,380.08	753.88	-302.21	14,465,895.571	1,744,953.022	39.832327374	-80.627633439
10,566.00	6.26	335.490	10,473.39	764.34	-306.70	14,465,906.026	1,744,948.529	39.832356138	-80.627649289
10,659.00	4.54	329.490	10,565.97	772.12	-310.67	14,465,913.811	1,744,944.557	39.832377563	-80.627663323
10,752.00	3.16	326.610	10,658.76	777.44	-313.95	14,465,919.123	1,744,941.277	39.832392187	-80.627674926
10,845.00	2.42	325.290	10,751.65	781.19	-316.48	14,465,922.877	1,744,938.748	39.832402526	-80.627683878
10,961.00	2.51	328.630	10,867.54	785.37	-319.20	14,465,927.059	1,744,936.032	39.832414042	-80.627693493
11,054.00	1.49	328.980	10,960.49	788.15	-320.88	14,465,929.834	1,744,934.348	39.832421682	-80.627699447
Tie into original hole @ 11054 MD									
11,079.00	1.41	327.270	10,985.48	788.69	-321.21	14,465,930.371	1,744,934.015	39.832423161	-80.627700628
11,126.00	0.71	283.650	11,032.47	789.24	-321.81	14,465,930.927	1,744,933.419	39.832424692	-80.627702742
11,173.00	0.66	227.950	11,079.47	789.13	-322.29	14,465,930.814	1,744,932.935	39.832424389	-80.627704468
11,220.00	1.19	185.910	11,126.46	788.46	-322.55	14,465,930.147	1,744,932.684	39.832422561	-80.627705372
11,265.00	1.41	181.810	11,171.45	787.44	-322.61	14,465,929.129	1,744,932.618	39.832419765	-80.627705621
11,329.00	3.89	149.730	11,235.38	784.78	-321.54	14,465,926.467	1,744,933.688	39.832412441	-80.627701851
11,376.00	9.19	147.260	11,282.06	780.24	-318.71	14,465,921.930	1,744,936.523	39.832399949	-80.627691818
11,423.00	16.00	146.330	11,327.90	771.69	-313.08	14,465,913.372	1,744,942.151	39.832376383	-80.627671899
11,471.00	20.33	149.550	11,373.50	758.99	-305.18	14,465,900.672	1,744,950.048	39.832341166	-80.627643958
11,518.00	22.76	153.030	11,417.21	743.84	-296.92	14,465,885.528	1,744,958.311	39.832299733	-80.627614751
11,565.00	25.54	151.840	11,460.09	726.80	-288.01	14,465,868.489	1,744,967.217	39.832252839	-80.627583279
11,612.00	29.87	151.050	11,501.70	707.62	-277.56	14,465,849.306	1,744,977.669	39.832200039	-80.627546334
11,659.00	33.94	150.340	11,541.59	685.97	-265.40	14,465,827.654	1,744,989.832	39.832140439	-80.627503330
11,706.00	37.34	149.900	11,579.78	662.23	-251.75	14,465,803.914	1,745,003.477	39.832075087	-80.627455079
11,752.00	39.86	148.890	11,615.73	637.53	-237.14	14,465,779.219	1,745,018.092	39.832007104	-80.627403386
11,799.00	42.69	148.540	11,651.05	611.04	-221.04	14,465,752.727	1,745,034.193	39.831934166	-80.627346427
11,844.00	45.07	148.540	11,683.48	584.44	-204.76	14,465,726.122	1,745,050.471	39.831860918	-80.627288840
11,891.00	47.95	149.200	11,715.82	555.25	-187.14	14,465,696.936	1,745,068.093	39.831780562	-80.627226504
11,937.00	50.60	149.510	11,745.83	525.26	-169.37	14,465,666.945	1,745,085.859	39.831697998	-80.627163667
11,984.00	52.98	149.370	11,774.90	493.46	-150.59	14,465,635.147	1,745,104.635	39.831610460	-80.627097259
12,031.00	55.33	149.590	11,802.42	460.64	-131.25	14,465,602.329	1,745,123.981	39.831520113	-80.627028838
12,078.00	57.53	150.830	11,828.41	426.66	-111.80	14,465,568.344	1,745,143.430	39.831426559	-80.626960065
12,126.00	60.41	151.710	11,853.15	390.59	-92.03	14,465,532.278	1,745,163.195	39.831327289	-80.626890201
12,173.00	63.41	152.060	11,875.28	354.02	-72.50	14,465,495.710	1,745,182.731	39.831226642	-80.626821159
12,220.00	66.55	152.460	11,895.15	316.33	-52.68	14,465,458.020	1,745,202.550	39.831122909	-80.626751123
12,267.00	70.04	152.110	11,912.53	277.68	-32.37	14,465,419.369	1,745,222.857	39.831016533	-80.626679366
12,314.00	72.65	152.020	11,927.57	238.34	-11.51	14,465,380.031	1,745,243.717	39.830908262	-80.626605650
12,361.00	75.87	152.060	11,940.31	198.39	9.70	14,465,340.079	1,745,264.924	39.830798303	-80.626530706
12,408.00	80.03	152.190	11,950.12	157.77	31.18	14,465,299.456	1,745,286.409	39.830686499	-80.626454782
12,455.00	84.40	152.370	11,956.49	116.56	52.84	14,465,258.244	1,745,308.064	39.830573072	-80.626378262
12,503.00	88.42	152.280	11,959.49	74.14	75.08	14,465,215.827	1,745,330.309	39.830456332	-80.626299656
12,597.00	88.56	151.890	11,961.97	-8.89	119.07	14,465,132.794	1,745,374.301	39.830227800	-80.626144198
12,691.00	89.17	151.670	11,963.83	-91.70	163.51	14,465,049.984	1,745,418.741	39.829999875	-80.625987141
12,785.00	89.22	149.460	11,965.15	-173.56	209.70	14,464,968.131	1,745,464.928	39.829774560	-80.625823846
12,880.00	89.13	149.070	11,966.52	-255.20	258.25	14,464,886.484	1,745,513.474	39.829549781	-80.625652148
12,974.00	89.17	149.420	11,967.92	-335.98	306.31	14,464,805.713	1,745,561.537	39.829327414	-80.625482158
13,068.00	89.13	148.580	11,969.31	-416.54	354.72	14,464,725.149	1,745,609.945	39.829105611	-80.625310939
13,162.00	89.13	148.930	11,970.74	-496.90	403.47	14,464,644.793	1,745,658.697	39.828884374	-80.625138492
13,256.00	89.17	148.620	11,972.13	-577.27	452.19	14,464,564.419	1,745,707.421	39.828663089	-80.624966145
13,350.00	89.22	150.040	11,973.45	-658.11	500.14	14,464,483.578	1,745,755.364	39.828440530	-80.624796590
13,444.00	89.13	149.810	11,974.81	-739.45	547.24	14,464,402.242	1,745,802.465	39.828216621	-80.624630040
13,538.00	89.13	150.520	11,976.23	-820.98	594.00	14,464,320.710	1,745,849.225	39.827992179	-80.624464711
13,632.00	89.09	150.210	11,977.69	-902.67	640.47	14,464,239.016	1,745,895.700	39.827767294	-80.624300400
13,726.00	89.13	149.510	11,979.15	-983.95	687.67	14,464,157.736	1,745,942.892	39.827543535	-80.624133527



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,820.00	89.22	149.730	11,980.51	-1,065.04	735.20	14,464,076.651	1,745,990.426	39.827320311	-80.623965437
13,914.00	89.09	149.070	11,981.89	-1,145.94	783.04	14,463,995.751	1,746,038.270	39.827097589	-80.623796240
14,008.00	89.13	149.860	11,983.35	-1,226.89	830.80	14,463,914.798	1,746,086.022	39.826874722	-80.623627373
14,102.00	89.13	149.510	11,984.78	-1,308.03	878.24	14,463,833.660	1,746,133.463	39.826651354	-80.623459617
14,197.00	89.17	149.590	11,986.19	-1,389.92	926.38	14,463,751.773	1,746,181.603	39.826425916	-80.623289387
14,291.00	89.17	149.550	11,987.55	-1,470.96	973.98	14,463,670.730	1,746,229.207	39.826202805	-80.623121050
14,387.00	89.26	149.730	11,988.87	-1,553.79	1,022.50	14,463,587.903	1,746,277.724	39.825974782	-80.622949492
14,480.00	89.22	150.650	11,990.10	-1,634.47	1,068.73	14,463,507.217	1,746,323.952	39.825752665	-80.622786055
14,574.00	89.26	149.460	11,991.35	-1,715.92	1,115.64	14,463,425.774	1,746,370.869	39.825528463	-80.622620176
14,667.00	89.22	151.140	11,992.58	-1,796.69	1,161.71	14,463,345.002	1,746,416.941	39.825306110	-80.622457299
14,760.00	89.13	150.870	11,993.92	-1,878.03	1,206.79	14,463,263.667	1,746,462.016	39.825082224	-80.622297979
14,853.00	89.22	150.700	11,995.26	-1,959.19	1,252.18	14,463,182.506	1,746,507.403	39.824858811	-80.622137547
14,946.00	89.17	151.180	11,996.57	-2,040.47	1,297.35	14,463,101.222	1,746,552.571	39.824635064	-80.621977900
15,039.00	89.17	151.090	11,997.91	-2,121.91	1,342.24	14,463,019.785	1,746,597.462	39.824410899	-80.621819243
15,133.00	89.13	151.140	11,999.31	-2,204.20	1,387.64	14,462,937.488	1,746,642.864	39.824184369	-80.621658779
15,227.00	89.26	151.310	12,000.63	-2,286.59	1,432.88	14,462,855.104	1,746,688.108	39.823957598	-80.621498879
15,320.00	89.13	151.050	12,001.94	-2,368.06	1,477.71	14,462,773.632	1,746,732.935	39.823733336	-80.621340453
15,413.00	89.22	151.090	12,003.27	-2,449.45	1,522.69	14,462,692.245	1,746,777.918	39.823509309	-80.621181470
15,506.00	89.09	150.560	12,004.65	-2,530.64	1,568.02	14,462,611.053	1,746,823.249	39.823285810	-80.621021249
15,598.00	89.09	150.780	12,006.11	-2,610.84	1,613.08	14,462,530.857	1,746,868.308	39.823065049	-80.620861979
15,691.00	89.17	150.870	12,007.52	-2,692.03	1,658.41	14,462,449.665	1,746,913.638	39.822841551	-80.620701760
15,784.00	89.17	151.000	12,008.87	-2,773.31	1,703.59	14,462,368.385	1,746,958.813	39.822617813	-80.620542098
15,878.00	89.13	150.080	12,010.26	-2,855.14	1,749.81	14,462,286.549	1,747,005.038	39.822392536	-80.620378704
15,971.00	89.17	150.120	12,011.64	-2,935.76	1,796.17	14,462,205.937	1,747,051.392	39.822170616	-80.620214833
16,065.00	89.26	150.520	12,012.93	-3,017.42	1,842.71	14,462,124.277	1,747,097.932	39.821945818	-80.620050317
16,158.00	89.17	150.080	12,014.20	-3,098.19	1,888.78	14,462,043.503	1,747,144.005	39.821723456	-80.619887451
16,252.00	89.09	150.340	12,015.63	-3,179.76	1,935.48	14,461,961.934	1,747,190.701	39.821498906	-80.619722381
16,346.00	89.17	153.650	12,017.06	-3,262.73	1,979.60	14,461,878.962	1,747,234.827	39.821270532	-80.619566484
16,439.00	89.17	147.700	12,018.41	-3,343.77	2,025.13	14,461,797.925	1,747,280.350	39.821047454	-80.619405586
16,533.00	89.26	148.450	12,019.69	-3,423.54	2,074.83	14,461,718.151	1,747,330.053	39.820827798	-80.619229782
Survey @ 16533.00 MD 12019.69 TVD									
16,646.00	89.26	148.450	12,021.15	-3,519.83	2,133.95	14,461,621.863	1,747,389.174	39.820562677	-80.619020687
Survey Proj. to 16646.00 MD 12021.15 TVD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,054.00	10,960.49	788.15	-320.88	Tie into original hole @ 11054 MD
16,533.00	12,019.69	-3,423.54	2,074.83	Survey @ 16533.00 MD 12019.69 TVD
16,646.00	12,021.15	-3,519.83	2,133.95	Survey Proj. to 16646.00 MD 12021.15 TVD

Checked By: _____ Approved By: _____ Date: _____

02/23/2024



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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-20 HU (slot T)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,141.688 usft	Latitude:	39.830253590
	+E/-W	0.00 ft	Easting:	1,745,255.228 usft	Longitude:	-80.626568190
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	1,370.00 ft
Grid Convergence:	0.24 °					

Wellbore	Sidetrack 02				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	10/5/2022	-8.72	66.43	51,624.37942675

Design	Surveys Sidetrack 02				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	15,506.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	149.713	

Survey Program	Date 10/21/2022				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
214.50	1,163.50	MWD surf (Original Hole)	MWD	MWD - Standard	
1,211.50	2,993.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,045.50	5,859.50	MWD 3045.5-5859.5 MD (Original Hole)	MWD	MWD - Standard	
5,900.00	10,845.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
10,961.00	11,054.00	MWD (Original Hole)	MWD	MWD - Standard	
11,079.00	15,506.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard	
15,596.00	24,359.00	MWD ST2 (Sidetrack 02)	MWD	MWD - Standard	
24,416.00	24,416.00	Projection (Sidetrack 02)	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	
214.50	0.18	144.480	214.50	-0.27	0.20	0.34	0.08	0.08	0.00	
245.50	0.11	42.990	245.50	-0.29	0.24	0.38	0.74	-0.23	-327.39	
273.50	0.17	46.490	273.50	-0.24	0.29	0.36	0.22	0.21	12.50	



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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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
302.50	0.15	48.000	302.50	-0.19	0.35	0.34	0.07	-0.07	5.21
330.50	0.17	23.310	330.50	-0.13	0.40	0.31	0.25	0.07	-88.18
362.50	0.21	324.750	362.50	-0.03	0.38	0.22	0.59	0.13	-183.00
394.50	0.26	8.330	394.50	0.09	0.36	0.11	0.56	0.16	136.19
424.50	0.30	349.160	424.50	0.23	0.35	-0.02	0.34	0.13	-63.90
456.50	0.12	123.870	456.50	0.29	0.36	-0.07	1.23	-0.56	420.97
488.50	0.23	357.560	488.50	0.34	0.39	-0.10	0.99	0.34	-394.72
520.50	0.34	326.270	520.50	0.48	0.33	-0.25	0.58	0.34	-97.78
551.50	0.34	33.400	551.50	0.64	0.33	-0.38	1.21	0.00	216.55
583.50	0.54	12.590	583.50	0.86	0.42	-0.53	0.79	0.63	-65.03
615.50	0.62	357.490	615.49	1.18	0.44	-0.80	0.54	0.25	-47.19
647.50	0.74	338.480	647.49	1.55	0.36	-1.15	0.79	0.38	-59.41
678.50	0.67	358.780	678.49	1.91	0.28	-1.51	0.83	-0.23	65.48
710.50	1.01	347.910	710.49	2.38	0.22	-1.94	1.17	1.06	-33.97
742.50	0.93	2.950	742.48	2.91	0.17	-2.43	0.83	-0.25	47.00
773.50	1.44	355.180	773.48	3.55	0.16	-2.99	1.72	1.65	-25.06
805.50	0.79	6.060	805.47	4.17	0.14	-3.53	2.13	-2.03	34.00
837.50	0.60	7.450	837.47	4.56	0.19	-3.84	0.60	-0.59	4.34
869.50	0.12	329.430	869.47	4.75	0.19	-4.01	1.60	-1.50	-118.81
901.50	0.19	37.620	901.47	4.82	0.21	-4.06	0.57	0.22	213.09
932.50	0.17	36.980	932.47	4.90	0.27	-4.10	0.06	-0.06	-2.06
964.50	0.22	7.580	964.47	5.00	0.31	-4.16	0.34	0.16	-91.88
996.50	0.41	25.830	996.47	5.16	0.36	-4.28	0.66	0.59	57.03
1,059.50	0.64	6.830	1,059.46	5.72	0.50	-4.68	0.45	0.37	-30.16
1,122.50	0.73	8.380	1,122.46	6.46	0.60	-5.28	0.15	0.14	2.46
1,163.50	0.79	31.650	1,163.45	6.96	0.79	-5.61	0.76	0.15	56.76
1,211.50	0.52	33.930	1,211.45	7.42	1.09	-5.86	0.57	-0.56	4.75
1,243.50	0.62	21.970	1,243.45	7.70	1.23	-6.03	0.48	0.31	-37.38
1,274.50	0.74	25.790	1,274.45	8.04	1.38	-6.25	0.41	0.39	12.32
1,306.50	1.01	35.520	1,306.44	8.46	1.63	-6.48	0.96	0.84	30.41
1,337.50	1.10	39.950	1,337.44	8.91	1.98	-6.69	0.39	0.29	14.29
1,369.50	1.36	40.050	1,369.43	9.43	2.43	-6.92	0.81	0.81	0.31
1,401.50	1.53	36.310	1,401.42	10.07	2.92	-7.22	0.61	0.53	-11.69
1,432.50	1.39	43.730	1,432.41	10.67	3.43	-7.49	0.76	-0.45	23.94
1,464.50	1.28	48.980	1,464.40	11.19	3.97	-7.66	0.51	-0.34	16.41
1,495.50	1.15	39.980	1,495.40	11.65	4.43	-7.83	0.74	-0.42	-29.03
1,527.50	0.89	48.800	1,527.39	12.06	4.82	-7.99	0.95	-0.81	27.56
1,558.50	0.60	65.620	1,558.39	12.29	5.15	-8.01	1.16	-0.94	54.26
1,590.50	0.31	113.070	1,590.39	12.32	5.38	-7.93	1.41	-0.91	148.28
1,622.50	0.43	151.830	1,622.39	12.18	5.52	-7.74	0.84	0.38	121.13
1,654.50	0.38	155.370	1,654.39	11.98	5.62	-7.51	0.17	-0.16	11.06
1,686.50	0.39	194.190	1,686.38	11.78	5.64	-7.33	0.80	0.03	121.31
1,717.50	0.31	213.680	1,717.38	11.61	5.56	-7.22	0.46	-0.26	62.87

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Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
1,749.50	0.24	248.360	1,749.38	11.51	5.45	-7.19	0.55	-0.22	108.38
1,780.50	0.28	269.990	1,780.38	11.49	5.32	-7.24	0.34	0.13	69.77
1,812.50	0.36	280.910	1,812.38	11.51	5.14	-7.34	0.31	0.25	34.13
1,843.50	0.51	291.250	1,843.38	11.57	4.92	-7.51	0.54	0.48	33.35
1,875.50	0.62	283.160	1,875.38	11.67	4.62	-7.75	0.42	0.34	-25.28
1,907.50	0.81	284.580	1,907.38	11.76	4.23	-8.02	0.60	0.59	4.44
1,939.50	0.98	280.910	1,939.37	11.87	3.74	-8.36	0.56	0.53	-11.47
1,970.50	0.89	262.320	1,970.37	11.89	3.24	-8.63	1.02	-0.29	-59.97
2,001.50	1.10	239.570	2,001.37	11.71	2.75	-8.72	1.43	0.68	-73.39
2,033.50	1.50	223.000	2,033.36	11.24	2.20	-8.60	1.70	1.25	-51.78
2,064.50	1.50	215.090	2,064.35	10.61	1.69	-8.32	0.67	0.00	-25.52
2,096.50	1.52	209.520	2,096.34	9.90	1.24	-7.93	0.46	0.06	-17.41
2,128.50	1.03	203.490	2,128.33	9.27	0.91	-7.54	1.59	-1.53	-18.84
2,159.50	1.07	180.260	2,159.32	8.72	0.80	-7.13	1.37	0.13	-74.94
2,191.50	0.93	173.210	2,191.32	8.17	0.83	-6.64	0.58	-0.44	-22.03
2,222.50	0.97	162.010	2,222.31	7.67	0.94	-6.15	0.61	0.13	-36.13
2,254.50	1.09	150.510	2,254.31	7.15	1.17	-5.58	0.75	0.38	-35.94
2,286.50	1.22	146.800	2,286.30	6.60	1.51	-4.93	0.47	0.41	-11.59
2,317.50	1.20	146.030	2,317.30	6.05	1.87	-4.28	0.08	-0.06	-2.48
2,349.50	1.21	134.630	2,349.29	5.54	2.30	-3.62	0.75	0.03	-35.63
2,381.50	1.08	143.300	2,381.28	5.06	2.72	-2.99	0.68	-0.41	27.09
2,413.50	1.22	123.810	2,413.28	4.63	3.18	-2.39	1.29	0.44	-60.91
2,444.50	1.03	131.480	2,444.27	4.26	3.67	-1.83	0.78	-0.61	24.74
2,476.50	0.92	122.970	2,476.26	3.93	4.10	-1.32	0.57	-0.34	-26.59
2,507.50	0.75	129.890	2,507.26	3.66	4.46	-0.91	0.64	-0.55	22.32
2,539.50	0.68	122.750	2,539.26	3.42	4.78	-0.54	0.35	-0.22	-22.31
2,571.50	0.48	131.890	2,571.26	3.23	5.04	-0.25	0.69	-0.63	28.56
2,602.50	0.17	170.870	2,602.26	3.10	5.15	-0.08	1.17	-1.00	125.74
2,634.50	0.15	190.710	2,634.26	3.01	5.15	-0.01	0.18	-0.06	62.00
2,665.50	0.29	274.630	2,665.26	2.98	5.06	-0.02	1.01	0.45	270.71
2,697.50	0.44	312.420	2,697.26	3.07	4.89	-0.18	0.86	0.47	118.09
2,729.50	0.57	312.980	2,729.25	3.26	4.68	-0.45	0.41	0.41	1.75
2,759.50	0.53	311.700	2,759.25	3.45	4.47	-0.73	0.14	-0.13	-4.27
2,791.50	0.80	311.720	2,791.25	3.70	4.19	-1.08	0.84	0.84	0.06
2,823.50	0.85	332.480	2,823.25	4.06	3.91	-1.53	0.94	0.16	64.88
2,855.50	0.91	335.690	2,855.24	4.50	3.70	-2.02	0.24	0.19	10.03
2,886.50	0.97	338.030	2,886.24	4.97	3.50	-2.53	0.23	0.19	7.55
2,918.50	1.05	340.100	2,918.23	5.50	3.30	-3.08	0.27	0.25	6.47
2,950.50	1.17	340.140	2,950.23	6.08	3.09	-3.69	0.38	0.38	0.13
2,993.50	1.58	348.010	2,993.22	7.07	2.82	-4.69	1.05	0.95	18.30
3,045.50	1.89	345.820	3,045.19	8.60	2.46	-6.19	0.61	0.60	-4.21
3,077.50	2.08	352.290	3,077.17	9.69	2.25	-7.23	0.92	0.59	20.22
3,109.50	1.85	355.260	3,109.15	10.78	2.13	-8.24	0.79	-0.72	9.28

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Site:	Breckenridge (1 row)	MD Reference:	RKB=1370+32.5 @ 1402.50ft (Nabors X14)
Well:	Breckenridge S-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
3,141.50	1.09	357.630	3,141.14	11.60	2.07	-8.97	2.38	-2.38	7.41
3,172.50	0.23	350.750	3,172.14	11.96	2.05	-9.29	2.78	-2.77	-22.19
3,204.50	0.32	179.780	3,204.14	11.93	2.04	-9.27	1.71	0.28	-534.28
3,236.50	0.63	182.360	3,236.14	11.67	2.04	-9.05	0.97	0.97	8.06
3,268.50	0.88	185.620	3,268.14	11.25	2.00	-8.70	0.79	0.78	10.19
3,300.50	1.04	192.190	3,300.13	10.72	1.92	-8.29	0.61	0.50	20.53
3,331.50	1.13	190.980	3,331.13	10.14	1.80	-7.85	0.30	0.29	-3.90
3,363.50	1.23	195.200	3,363.12	9.50	1.65	-7.37	0.41	0.31	13.19
3,394.50	1.28	196.440	3,394.11	8.85	1.47	-6.90	0.18	0.16	4.00
3,426.50	1.25	198.600	3,426.11	8.17	1.25	-6.43	0.18	-0.09	6.75
3,457.50	1.20	198.520	3,457.10	7.55	1.04	-5.99	0.16	-0.16	-0.26
3,489.50	1.22	200.580	3,489.09	6.91	0.82	-5.55	0.15	0.06	6.44
3,521.50	1.14	200.710	3,521.08	6.29	0.58	-5.14	0.25	-0.25	0.41
3,552.50	0.53	213.600	3,552.08	5.88	0.40	-4.88	2.05	-1.97	41.58
3,584.50	0.66	340.960	3,584.08	5.94	0.25	-5.00	3.34	0.41	398.00
3,615.50	1.42	359.750	3,615.07	6.49	0.19	-5.50	2.66	2.45	60.61
3,647.50	1.87	3.430	3,647.06	7.41	0.22	-6.28	1.44	1.41	11.50
3,679.50	2.29	5.610	3,679.04	8.56	0.32	-7.23	1.34	1.31	6.81
3,710.50	2.53	8.030	3,710.01	9.86	0.47	-8.27	0.84	0.77	7.81
3,742.50	2.71	7.900	3,741.98	11.31	0.68	-9.42	0.56	0.56	-0.41
3,773.50	2.79	7.890	3,772.94	12.78	0.88	-10.59	0.26	0.26	-0.03
3,804.50	2.42	11.230	3,803.91	14.17	1.11	-11.67	1.29	-1.19	10.77
3,835.50	1.71	7.580	3,834.89	15.27	1.30	-12.53	2.33	-2.29	-11.77
3,867.50	1.45	5.790	3,866.88	16.14	1.40	-13.23	0.83	-0.81	-5.59
3,899.50	1.38	4.290	3,898.87	16.93	1.47	-13.88	0.25	-0.22	-4.69
3,929.50	1.38	4.050	3,928.86	17.65	1.53	-14.47	0.02	0.00	-0.80
3,961.50	1.39	0.040	3,960.85	18.42	1.55	-15.13	0.30	0.03	-12.53
3,993.50	1.61	359.180	3,992.84	19.26	1.55	-15.85	0.69	0.69	-2.69
4,024.50	1.63	359.260	4,023.83	20.14	1.54	-16.62	0.06	0.06	0.26
4,055.50	1.93	358.010	4,054.81	21.10	1.51	-17.46	0.98	0.97	-4.03
4,087.50	2.42	359.120	4,086.79	22.32	1.48	-18.52	1.54	1.53	3.47
4,119.50	2.90	0.700	4,118.76	23.80	1.48	-19.80	1.52	1.50	4.94
4,150.50	3.28	359.930	4,149.71	25.47	1.49	-21.24	1.23	1.23	-2.48
4,182.50	3.55	1.370	4,181.65	27.38	1.51	-22.88	0.89	0.84	4.50
4,213.50	3.83	0.380	4,212.59	29.37	1.54	-24.58	0.93	0.90	-3.19
4,245.50	3.69	354.860	4,244.52	31.47	1.46	-26.44	1.21	-0.44	-17.25
4,277.50	3.12	349.750	4,276.46	33.35	1.21	-28.19	2.02	-1.78	-15.97
4,308.50	3.01	345.340	4,307.42	34.97	0.85	-29.76	0.84	-0.35	-14.23
4,340.50	3.19	345.700	4,339.37	36.64	0.42	-31.43	0.57	0.56	1.13
4,372.50	3.44	344.280	4,371.32	38.43	-0.06	-33.21	0.82	0.78	-4.44
4,404.50	3.74	347.030	4,403.26	40.37	-0.55	-35.14	1.08	0.94	8.59
4,435.50	3.67	348.160	4,434.19	42.33	-0.98	-37.05	0.33	-0.23	3.65
4,467.50	3.37	352.760	4,466.13	44.26	-1.31	-38.88	1.29	-0.94	14.38
4,498.50	3.22	357.070	4,497.08	46.04	-1.47	-40.49	0.93	-0.48	13.90



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
4,530.50	3.26	359.980	4,529.03	47.84	-1.52	-42.08	0.53	0.13	9.09
4,562.50	3.48	1.430	4,560.97	49.72	-1.49	-43.69	0.74	0.69	4.53
4,594.50	3.78	1.510	4,592.91	51.75	-1.44	-45.41	0.94	0.94	0.25
4,626.50	3.59	4.890	4,624.84	53.80	-1.33	-47.13	0.90	-0.59	10.56
4,658.50	3.01	5.330	4,656.79	55.64	-1.17	-48.63	1.81	-1.81	1.38
4,689.50	2.97	7.670	4,687.75	57.24	-0.98	-49.92	0.41	-0.13	7.55
4,721.50	2.78	10.870	4,719.71	58.83	-0.73	-51.16	0.78	-0.59	10.00
4,753.50	2.15	16.380	4,751.68	60.16	-0.41	-52.16	2.10	-1.97	17.22
4,785.50	1.77	15.560	4,783.66	61.22	-0.11	-52.91	1.19	-1.19	-2.56
4,816.50	1.24	11.610	4,814.65	62.01	0.09	-53.50	1.74	-1.71	-12.74
4,848.50	1.12	7.270	4,846.64	62.66	0.20	-54.00	0.47	-0.38	-13.56
4,879.50	1.18	356.340	4,877.64	63.27	0.22	-54.53	0.73	0.19	-35.26
4,911.50	1.17	356.950	4,909.63	63.93	0.18	-55.11	0.05	-0.03	1.91
4,943.50	0.79	347.870	4,941.62	64.47	0.11	-55.61	1.28	-1.19	-28.38
4,975.50	0.50	323.980	4,973.62	64.80	-0.02	-55.96	1.22	-0.91	-74.66
5,007.50	0.31	292.790	5,005.62	64.95	-0.18	-56.17	0.89	-0.59	-97.47
5,039.50	0.35	271.860	5,037.62	64.98	-0.35	-56.29	0.39	0.13	-65.41
5,070.50	0.44	256.300	5,068.62	64.96	-0.56	-56.38	0.45	0.29	-50.19
5,102.50	0.41	246.630	5,100.62	64.88	-0.79	-56.43	0.24	-0.09	-30.22
5,133.50	0.51	250.410	5,131.62	64.79	-1.02	-56.46	0.34	0.32	12.19
5,165.50	0.64	236.450	5,163.62	64.65	-1.30	-56.48	0.59	0.41	-43.63
5,197.50	0.62	234.560	5,195.61	64.45	-1.59	-56.46	0.09	-0.06	-5.91
5,228.50	0.67	241.610	5,226.61	64.26	-1.89	-56.45	0.30	0.16	22.74
5,260.50	0.72	233.490	5,258.61	64.06	-2.22	-56.43	0.34	0.16	-25.38
5,292.50	0.91	238.670	5,290.61	63.80	-2.60	-56.40	0.64	0.59	16.19
5,323.50	0.98	241.220	5,321.60	63.55	-3.04	-56.41	0.26	0.23	8.23
5,355.50	0.80	236.240	5,353.60	63.29	-3.46	-56.40	0.61	-0.56	-15.56
5,385.50	0.67	237.340	5,383.60	63.08	-3.79	-56.38	0.44	-0.43	3.67
5,417.50	0.49	237.170	5,415.59	62.91	-4.06	-56.37	0.56	-0.56	-0.53
5,449.50	0.15	237.480	5,447.59	62.81	-4.21	-56.36	1.06	-1.06	0.97
5,480.50	0.18	193.630	5,478.59	62.74	-4.25	-56.32	0.41	0.10	-141.45
5,512.50	0.20	222.210	5,510.59	62.65	-4.30	-56.27	0.30	0.06	89.31
5,544.50	0.11	173.810	5,542.59	62.58	-4.34	-56.22	0.47	-0.28	-151.25
5,575.50	0.41	99.140	5,573.59	62.53	-4.22	-56.13	1.28	0.97	-240.87
5,607.50	0.68	96.440	5,605.59	62.49	-3.92	-55.94	0.85	0.84	-8.44
5,638.50	0.74	87.960	5,636.59	62.48	-3.54	-55.74	0.39	0.19	-27.35
5,670.50	1.04	88.250	5,668.59	62.49	-3.04	-55.50	0.94	0.94	0.91
5,701.50	1.15	83.970	5,699.58	62.54	-2.45	-55.24	0.44	0.35	-13.81
5,733.50	1.05	91.950	5,731.57	62.56	-1.84	-54.95	0.57	-0.31	24.94
5,764.50	0.81	95.870	5,762.57	62.53	-1.34	-54.67	0.80	-0.77	12.65
5,796.50	0.76	95.680	5,794.57	62.48	-0.90	-54.41	0.16	-0.16	-0.59
5,827.50	0.81	95.290	5,825.56	62.44	-0.48	-54.18	0.46	0.16	-1.26
5,859.50	0.82	92.340	5,857.56	62.41	-0.03	-53.91	0.13	0.03	-9.22



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
5,900.00	0.78	88.260	5,898.06	62.41	0.54	-53.62	0.17	-0.10	-10.07
5,993.00	1.09	103.030	5,991.04	62.23	2.03	-52.71	0.42	0.33	15.88
6,087.00	1.31	107.900	6,085.02	61.70	3.93	-51.29	0.26	0.23	5.18
6,180.00	0.77	96.060	6,178.01	61.30	5.56	-50.13	0.62	-0.58	-12.73
6,273.00	0.68	69.030	6,271.00	61.44	6.70	-49.67	0.38	-0.10	-29.06
6,367.00	0.25	266.430	6,365.00	61.62	7.01	-49.67	0.98	-0.46	-172.98
6,460.00	0.73	281.310	6,458.00	61.73	6.23	-50.16	0.53	0.52	16.00
6,553.00	1.11	285.130	6,550.98	62.08	4.78	-51.19	0.41	0.41	4.11
6,646.00	0.33	316.660	6,643.98	62.51	3.73	-52.10	0.91	-0.84	33.90
6,739.00	0.15	69.150	6,736.98	62.75	3.66	-52.34	0.44	-0.19	120.96
6,833.00	0.43	75.220	6,830.97	62.88	4.11	-52.22	0.30	0.30	6.46
6,988.00	0.38	81.480	6,985.97	63.10	5.18	-51.88	0.04	-0.03	4.04
7,112.00	2.80	346.790	7,109.92	66.11	4.90	-54.62	2.30	1.95	-76.36
7,204.00	5.10	346.220	7,201.70	72.27	3.41	-60.69	2.50	2.50	-0.62
7,298.00	7.18	344.010	7,295.15	81.98	0.80	-70.39	2.23	2.21	-2.35
7,391.00	9.10	338.030	7,387.21	94.39	-3.56	-83.30	2.25	2.06	-6.43
7,484.00	11.12	332.420	7,478.77	109.16	-10.46	-99.54	2.41	2.17	-6.03
7,671.00	13.24	329.140	7,661.55	143.53	-29.80	-138.97	1.19	1.13	-1.75
7,764.00	13.39	331.270	7,752.05	162.12	-40.44	-160.38	0.55	0.16	2.29
7,857.00	13.57	331.230	7,842.49	181.12	-50.86	-182.05	0.19	0.19	-0.04
8,046.00	14.40	328.920	8,025.88	220.69	-73.67	-227.72	0.53	0.44	-1.22
8,140.00	14.15	332.420	8,116.98	240.88	-85.02	-250.88	0.96	-0.27	3.72
8,233.00	13.82	337.130	8,207.23	261.19	-94.60	-273.25	1.27	-0.35	5.06
8,327.00	14.50	338.130	8,298.37	282.46	-103.35	-296.03	0.77	0.72	1.06
8,420.00	14.66	336.890	8,388.38	304.09	-112.30	-319.22	0.38	0.17	-1.33
8,513.00	15.13	335.930	8,478.25	325.99	-121.87	-342.96	0.57	0.51	-1.03
8,606.00	15.50	334.720	8,567.95	348.31	-132.13	-367.41	0.53	0.40	-1.30
8,700.00	15.31	336.250	8,658.57	371.03	-142.49	-392.25	0.48	-0.20	1.63
8,794.00	14.29	337.690	8,749.45	393.12	-151.89	-416.07	1.15	-1.09	1.53
8,888.00	12.75	337.370	8,840.85	413.43	-160.29	-437.84	1.64	-1.64	-0.34
8,981.00	11.79	341.420	8,931.72	431.91	-167.27	-457.31	1.39	-1.03	4.35
9,075.00	12.73	338.610	9,023.58	450.65	-174.10	-476.95	1.18	1.00	-2.99
9,168.00	13.46	337.160	9,114.16	470.17	-182.04	-497.80	0.86	0.78	-1.56
9,262.00	14.33	337.120	9,205.41	490.97	-190.81	-520.19	0.93	0.93	-0.04
9,354.00	15.88	337.680	9,294.23	513.10	-200.02	-543.95	1.69	1.68	0.61
9,447.00	15.85	336.370	9,383.69	536.51	-209.94	-569.16	0.39	-0.03	-1.41
9,540.00	15.20	337.940	9,473.29	559.44	-210.61	-593.84	0.83	-0.70	1.69
9,634.00	14.64	338.880	9,564.12	581.95	-228.52	-617.77	0.65	-0.60	1.00
9,726.00	14.90	337.380	9,653.08	603.71	-237.26	-640.97	0.50	0.28	-1.63
9,819.00	16.26	337.670	9,742.66	626.79	-246.81	-665.71	1.46	1.46	0.31
9,913.00	15.66	337.630	9,833.04	650.70	-256.63	-691.31	0.64	-0.64	-0.04
10,006.00	14.28	336.170	9,922.88	672.80	-266.05	-715.14	1.54	-1.48	-1.57
10,100.00	13.08	335.480	10,014.21	693.08	-275.14	-737.24	1.29	-1.28	-0.73



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
10,193.00	11.51	335.770	10,105.08	711.12	-283.32	-756.94	1.69	-1.69	0.31
10,286.00	10.16	336.900	10,196.42	727.12	-290.35	-774.31	1.47	-1.45	1.22
10,379.00	9.21	334.960	10,288.09	741.41	-296.71	-789.86	1.08	-1.02	-2.09
10,472.00	7.65	337.770	10,380.08	753.88	-302.21	-803.40	1.73	-1.68	3.02
10,566.00	6.26	335.490	10,473.39	764.34	-306.70	-814.69	1.51	-1.48	-2.43
10,659.00	4.54	329.490	10,565.97	772.12	-310.67	-823.42	1.94	-1.85	-6.45
10,752.00	3.16	326.610	10,658.76	777.44	-313.95	-829.66	1.50	-1.48	-3.10
10,845.00	2.42	325.290	10,751.65	781.19	-316.48	-834.18	0.80	-0.80	-1.42
10,961.00	2.51	328.630	10,867.54	785.37	-319.20	-839.16	0.15	0.08	2.88
11,054.00	1.49	328.980	10,960.49	788.15	-320.88	-842.40	1.10	-1.10	0.38
11,079.00	1.41	327.270	10,985.48	788.69	-321.21	-843.04	0.36	-0.32	-6.84
11,126.00	0.71	283.650	11,032.47	789.24	-321.81	-843.82	2.17	-1.49	-92.81
11,173.00	0.66	227.950	11,079.47	789.13	-322.29	-843.96	1.36	-0.11	-118.51
11,220.00	1.19	185.910	11,126.46	788.46	-322.55	-843.51	1.76	1.13	-89.45
11,265.00	1.41	181.810	11,171.45	787.44	-322.61	-842.67	0.53	0.49	-9.11
11,329.00	3.89	149.730	11,235.38	784.78	-321.54	-839.83	4.37	3.88	-50.13
11,376.00	9.19	147.260	11,282.06	780.24	-318.71	-834.48	11.29	11.28	-5.26
11,423.00	16.00	146.330	11,327.90	771.69	-313.08	-824.25	14.50	14.49	-1.98
11,471.00	20.33	149.550	11,373.50	758.99	-305.18	-809.30	9.26	9.02	6.71
11,518.00	22.76	153.030	11,417.21	743.84	-296.92	-792.06	5.84	5.17	7.40
11,565.00	25.54	151.840	11,460.09	726.80	-288.01	-772.85	6.00	5.91	-2.53
11,612.00	29.87	151.050	11,501.70	707.62	-277.56	-751.02	9.25	9.21	-1.68
11,659.00	33.94	150.340	11,541.59	685.97	-265.40	-726.19	8.70	8.66	-1.51
11,706.00	37.34	149.900	11,579.78	662.23	-251.75	-698.81	7.25	7.23	-0.94
11,752.00	39.86	148.890	11,615.73	637.53	-237.14	-670.11	5.65	5.48	-2.20
11,799.00	42.69	148.540	11,651.05	611.04	-221.04	-639.11	6.04	6.02	-0.74
11,844.00	45.07	148.540	11,683.48	584.44	-204.76	-607.93	5.29	5.29	0.00
11,891.00	47.95	149.200	11,715.82	555.25	-187.14	-573.84	6.21	6.13	1.40
11,937.00	50.60	149.510	11,745.83	525.26	-169.37	-538.98	5.78	5.76	0.67
11,984.00	52.98	149.370	11,774.90	493.46	-150.59	-502.06	5.07	5.06	-0.30
12,031.00	55.33	149.590	11,802.42	460.64	-131.25	-463.96	5.01	5.00	0.47
12,078.00	57.53	150.830	11,828.41	426.66	-111.80	-424.80	5.17	4.68	2.64
12,126.00	60.41	151.710	11,853.15	390.59	-92.03	-383.69	6.20	6.00	1.83
12,173.00	63.41	152.060	11,875.28	354.02	-72.50	-342.26	6.42	6.38	0.74
12,220.00	66.55	152.460	11,895.15	316.33	-52.68	-299.72	6.73	6.68	0.85
12,267.00	70.04	152.110	11,912.53	277.68	-32.37	-256.11	7.46	7.43	-0.74
12,314.00	72.65	152.020	11,927.57	238.34	-11.51	-211.62	5.56	5.55	-0.19
12,361.00	75.87	152.060	11,940.31	198.39	9.70	-166.42	6.85	6.85	0.09
12,408.00	80.03	152.190	11,950.12	157.77	31.18	-120.51	8.86	8.85	0.28
12,455.00	84.40	152.370	11,956.49	116.56	52.84	-74.00	9.31	9.30	0.38
12,503.00	88.42	152.280	11,959.49	74.14	75.08	-26.15	8.38	8.38	-0.19
12,597.00	88.56	151.890	11,961.97	-8.89	119.07	67.73	0.44	0.15	-0.41
12,691.00	89.17	151.670	11,963.83	-91.70	163.51	161.65	0.69	0.65	-0.23
12,785.00	89.22	149.460	11,965.15	-173.56	209.70	255.63	2.35	0.05	-2.35



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
12,880.00	89.13	149.070	11,966.52	-255.20	258.25	350.61	0.42	-0.09	-0.41
12,974.00	89.17	149.420	11,967.92	-335.98	306.31	444.60	0.37	0.04	0.37
13,068.00	89.13	148.580	11,969.31	-416.54	354.72	538.58	0.89	-0.04	-0.89
13,162.00	89.13	148.930	11,970.74	-496.90	403.47	632.56	0.37	0.00	0.37
13,256.00	89.17	148.620	11,972.13	-577.27	452.19	726.53	0.33	0.04	-0.33
13,350.00	89.22	150.040	11,973.45	-658.11	500.14	820.52	1.51	0.05	1.51
13,444.00	89.13	149.810	11,974.81	-739.45	547.24	914.51	0.26	-0.10	-0.24
13,538.00	89.13	150.520	11,976.23	-820.98	594.00	1,008.50	0.76	0.00	0.76
13,632.00	89.09	150.210	11,977.69	-902.67	640.47	1,102.48	0.33	-0.04	-0.33
13,726.00	89.13	149.510	11,979.15	-983.95	687.67	1,196.47	0.75	0.04	-0.74
13,820.00	89.22	149.730	11,980.51	-1,065.04	735.20	1,290.46	0.25	0.10	0.23
13,914.00	89.09	149.070	11,981.89	-1,145.94	783.04	1,384.44	0.72	-0.14	-0.70
14,008.00	89.13	149.860	11,983.35	-1,226.89	830.80	1,478.43	0.84	0.04	0.84
14,102.00	89.13	149.510	11,984.78	-1,308.03	878.24	1,572.42	0.37	0.00	-0.37
14,197.00	89.17	149.590	11,986.19	-1,389.92	926.38	1,667.41	0.09	0.04	0.08
14,291.00	89.17	149.550	11,987.55	-1,470.96	973.98	1,761.40	0.04	0.00	-0.04
14,387.00	89.26	149.730	11,988.87	-1,553.79	1,022.50	1,857.39	0.21	0.09	0.19
14,480.00	89.22	150.650	11,990.10	-1,634.47	1,068.73	1,950.38	0.99	-0.04	0.99
14,574.00	89.26	149.460	11,991.35	-1,715.92	1,115.64	2,044.37	1.27	0.04	-1.27
14,667.00	89.22	151.140	11,992.58	-1,796.69	1,161.71	2,137.35	1.81	-0.04	1.81
14,760.00	89.13	150.870	11,993.92	-1,878.03	1,206.79	2,230.32	0.31	-0.10	-0.29
14,853.00	89.22	150.700	11,995.26	-1,959.19	1,252.18	2,323.29	0.21	0.10	-0.18
14,946.00	89.17	151.180	11,996.57	-2,040.47	1,297.35	2,416.26	0.52	-0.05	0.52
15,039.00	89.17	151.090	11,997.91	-2,121.91	1,342.24	2,509.22	0.10	0.00	-0.10
15,133.00	89.13	151.140	11,999.31	-2,204.20	1,387.64	2,603.18	0.07	-0.04	0.05
15,227.00	89.26	151.310	12,000.63	-2,286.59	1,432.88	2,697.14	0.23	0.14	0.18
15,320.00	89.13	151.050	12,001.94	-2,368.06	1,477.71	2,790.10	0.31	-0.14	-0.28
15,413.00	89.22	151.090	12,003.27	-2,449.45	1,522.69	2,883.07	0.11	0.10	0.04
15,506.00	89.09	150.560	12,004.65	-2,530.64	1,568.02	2,976.04	0.59	-0.14	-0.57
Tie into sidetrack 01 @ 15506 MD									
15,596.00	88.40	150.300	12,006.62	-2,608.90	1,612.43	3,066.01	0.82	-0.77	-0.29
15,627.00	85.76	150.560	12,008.20	-2,635.82	1,627.70	3,096.96	8.56	-8.52	0.84
15,657.00	83.60	149.680	12,010.98	-2,661.72	1,642.58	3,126.83	7.77	-7.20	-2.93
15,689.00	83.47	146.960	12,014.58	-2,688.78	1,659.28	3,158.61	8.46	-0.41	-8.50
15,720.00	85.89	144.060	12,017.46	-2,714.21	1,676.76	3,189.39	12.15	7.81	-9.35
15,751.00	89.49	142.040	12,018.71	-2,738.96	1,695.37	3,220.15	13.31	11.61	-6.52
15,781.00	91.74	141.770	12,018.38	-2,762.57	1,713.88	3,249.87	7.55	7.50	-0.90
15,828.00	90.37	142.040	12,017.52	-2,799.55	1,742.87	3,296.42	2.97	-2.91	0.57
15,875.00	91.47	144.940	12,016.76	-2,837.32	1,770.83	3,343.14	6.60	2.34	6.17
15,922.00	92.13	148.190	12,015.29	-2,876.51	1,796.71	3,390.04	7.05	1.40	6.91
15,968.00	90.29	148.980	12,014.32	-2,915.76	1,820.68	3,436.01	4.35	-4.00	1.72
16,062.00	90.24	149.070	12,013.88	-2,996.35	1,869.06	3,530.01	0.11	-0.05	0.10
16,155.00	89.93	149.070	12,013.74	-3,076.13	1,916.86	3,623.00	0.33	-0.33	0.00



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
16,249.00	88.79	149.240	12,014.79	-3,156.83	1,965.05	3,716.99	1.23	-1.21	0.18
16,343.00	88.53	149.240	12,016.99	-3,237.58	2,013.11	3,810.96	0.28	-0.28	0.00
16,436.00	88.66	150.120	12,019.27	-3,317.83	2,060.05	3,903.93	0.96	0.14	0.95
16,530.00	88.66	149.680	12,021.47	-3,399.14	2,107.17	3,997.90	0.47	0.00	-0.47
16,623.00	89.19	149.770	12,023.21	-3,479.44	2,154.05	4,090.89	0.58	0.57	0.10
16,715.00	89.01	149.860	12,024.66	-3,558.95	2,200.30	4,182.88	0.22	-0.20	0.10
16,808.00	89.67	151.880	12,025.73	-3,640.18	2,245.57	4,275.85	2.28	0.71	2.17
16,902.00	89.54	152.320	12,026.38	-3,723.25	2,289.55	4,369.76	0.49	-0.14	0.47
16,994.00	88.79	151.790	12,027.72	-3,804.52	2,332.66	4,461.67	1.00	-0.82	-0.58
17,087.00	89.19	152.500	12,029.36	-3,886.73	2,376.11	4,554.57	0.88	0.43	0.76
17,180.00	89.10	152.140	12,030.75	-3,969.07	2,419.30	4,647.47	0.40	-0.10	-0.39
17,273.00	87.91	152.500	12,033.17	-4,051.40	2,462.49	4,740.34	1.34	-1.28	0.39
17,367.00	88.18	152.760	12,036.38	-4,134.83	2,505.68	4,834.16	0.40	0.29	0.28
17,460.00	88.13	153.110	12,039.37	-4,217.60	2,547.97	4,926.97	0.38	-0.05	0.38
17,553.00	87.03	152.060	12,043.30	-4,300.08	2,590.75	5,019.76	1.63	-1.18	-1.13
17,646.00	87.47	152.230	12,047.76	-4,382.21	2,634.16	5,112.57	0.51	0.47	0.18
17,739.00	87.30	151.090	12,052.01	-4,463.98	2,678.26	5,205.42	1.24	-0.18	-1.23
17,833.00	87.56	151.000	12,056.22	-4,546.15	2,723.72	5,299.30	0.29	0.28	-0.10
17,925.00	87.43	150.740	12,060.24	-4,626.43	2,768.46	5,391.19	0.32	-0.14	-0.28
18,018.00	89.23	150.470	12,062.95	-4,707.42	2,814.09	5,484.14	1.96	1.94	-0.29
18,112.00	89.41	151.000	12,064.07	-4,789.42	2,860.04	5,578.12	0.60	0.19	0.56
18,206.00	89.41	150.740	12,065.04	-4,871.52	2,905.79	5,672.09	0.28	0.00	-0.28
18,298.00	89.10	150.470	12,066.23	-4,951.67	2,950.94	5,764.07	0.45	-0.34	-0.29
18,392.00	89.05	150.650	12,067.75	-5,033.52	2,997.14	5,858.05	0.20	-0.05	0.19
18,485.00	88.97	151.000	12,069.36	-5,114.71	3,042.47	5,951.02	0.39	-0.09	0.38
18,578.00	88.31	148.980	12,071.56	-5,195.22	3,088.97	6,043.99	2.28	-0.71	-2.17
18,670.00	88.44	149.510	12,074.17	-5,274.25	3,135.99	6,135.95	0.59	0.14	0.58
18,764.00	88.66	149.590	12,076.55	-5,355.26	3,183.62	6,229.92	0.25	0.23	0.09
18,856.00	88.66	149.950	12,078.70	-5,434.72	3,229.92	6,321.89	0.39	0.00	0.39
18,950.00	88.66	150.210	12,080.90	-5,516.17	3,276.80	6,415.86	0.28	0.00	0.28
19,044.00	88.57	150.470	12,083.17	-5,597.83	3,323.30	6,509.83	0.29	-0.10	0.28
19,137.00	88.62	150.830	12,085.45	-5,678.87	3,368.87	6,602.79	0.39	0.05	0.39
19,230.00	88.75	150.740	12,087.59	-5,760.02	3,414.25	6,695.75	0.17	0.14	-0.10
19,324.00	88.79	151.000	12,089.61	-5,842.11	3,460.00	6,789.71	0.28	0.04	0.28
19,418.00	88.66	151.260	12,091.70	-5,924.41	3,505.37	6,883.66	0.31	-0.14	0.28
19,511.00	89.01	151.440	12,093.59	-6,006.00	3,549.95	6,976.60	0.42	0.38	0.19
19,605.00	88.02	151.620	12,095.29	-6,088.62	3,594.75	7,070.54	0.21	-0.10	0.19
19,698.00	88.53	149.860	12,097.36	-6,169.73	3,640.20	7,163.49	1.94	-0.42	-1.89
19,791.00	88.26	149.240	12,099.96	-6,249.88	3,687.31	7,256.46	0.73	-0.29	-0.67
19,885.00	88.75	148.800	12,102.41	-6,330.44	3,735.68	7,350.42	0.70	0.52	-0.47
19,978.00	88.97	148.540	12,104.26	-6,409.86	3,784.02	7,443.38	0.37	0.24	-0.28
20,071.00	88.97	149.160	12,105.93	-6,489.44	3,832.12	7,536.36	0.67	0.00	0.67
20,165.00	88.97	148.450	12,107.62	-6,569.83	3,880.80	7,630.33	0.76	0.00	-0.76
20,257.00	88.79	150.030	12,109.42	-6,648.87	3,927.84	7,722.31	1.73	-0.20	1.72



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)
20,351.00	88.79	150.390	12,111.41	-6,730.43	3,974.54	7,816.28	0.38	0.00	0.38
20,444.00	89.27	151.260	12,112.98	-6,811.62	4,019.86	7,909.25	1.07	0.52	0.94
20,537.00	89.05	150.390	12,114.35	-6,892.81	4,065.19	8,002.22	0.96	-0.24	-0.94
20,630.00	87.91	150.650	12,116.81	-6,973.74	4,110.94	8,095.18	1.26	-1.23	0.28
20,724.00	87.91	150.210	12,120.24	-7,055.45	4,157.30	8,189.11	0.47	0.00	-0.47
20,816.00	87.82	149.680	12,123.67	-7,135.02	4,203.35	8,281.04	0.58	-0.10	-0.58
20,909.00	88.70	151.090	12,126.49	-7,215.83	4,249.28	8,373.99	1.79	0.95	1.52
21,003.00	87.87	153.200	12,129.31	-7,298.90	4,293.18	8,467.86	2.41	-0.88	2.24
21,096.00	88.57	154.430	12,132.19	-7,382.31	4,334.20	8,560.57	1.52	0.75	1.32
21,188.00	87.74	154.960	12,135.16	-7,465.44	4,373.50	8,652.17	1.07	-0.90	0.58
21,283.00	86.99	152.850	12,139.52	-7,550.66	4,415.24	8,746.81	2.35	-0.79	-2.22
21,376.00	86.59	150.740	12,144.73	-7,632.48	4,459.12	8,839.60	2.31	-0.43	-2.27
21,469.00	87.25	148.800	12,149.73	-7,712.72	4,505.87	8,932.46	2.20	0.71	-2.09
21,562.00	87.34	148.100	12,154.12	-7,791.88	4,554.48	9,025.34	0.76	0.10	-0.75
21,655.00	87.78	148.450	12,158.08	-7,870.91	4,603.34	9,118.22	0.60	0.47	0.38
21,748.00	88.13	148.450	12,161.40	-7,950.11	4,651.97	9,211.14	0.38	0.38	0.00
21,842.00	88.22	147.840	12,164.39	-8,029.92	4,701.56	9,305.06	0.66	0.10	-0.65
21,935.00	88.84	148.190	12,166.78	-8,108.77	4,750.80	9,397.98	0.77	0.67	0.38
22,029.00	88.75	144.850	12,168.75	-8,187.15	4,802.64	9,491.80	3.55	-0.10	-3.55
22,122.00	88.31	144.670	12,171.14	-8,263.08	4,856.28	9,584.43	0.51	-0.47	-0.19
22,215.00	90.51	148.630	12,172.10	-8,340.74	4,907.39	9,677.26	4.87	2.37	4.26
22,309.00	90.02	151.260	12,171.66	-8,422.09	4,954.46	9,771.25	2.85	-0.52	2.80
22,403.00	88.97	152.140	12,172.49	-8,504.85	4,999.03	9,865.19	1.46	-1.12	0.94
22,497.00	89.23	152.140	12,173.97	-8,587.95	5,042.95	9,959.10	0.28	0.28	0.00
22,590.00	89.56	152.320	12,174.95	-8,670.23	5,086.28	10,052.00	0.40	0.35	0.19
22,683.00	88.48	152.060	12,176.54	-8,752.48	5,129.66	10,144.90	1.19	-1.16	-0.28
22,777.00	88.26	150.210	12,179.21	-8,834.76	5,175.01	10,238.83	1.98	-0.23	-1.97
22,871.00	88.57	150.210	12,181.81	-8,916.31	5,221.70	10,332.79	0.33	0.33	0.00
22,963.00	89.19	150.390	12,183.61	-8,996.21	5,267.27	10,424.76	0.70	0.67	0.20
23,056.00	89.54	150.120	12,184.64	-9,076.95	5,313.41	10,517.75	0.48	0.38	-0.29
23,149.00	89.05	150.910	12,185.79	-9,157.89	5,359.18	10,610.74	1.00	-0.53	0.85
23,243.00	88.18	151.440	12,188.06	-9,240.22	5,404.49	10,704.68	1.08	-0.93	0.56
23,335.00	88.35	151.260	12,190.84	-9,320.92	5,448.58	10,796.60	0.27	0.18	-0.20
23,428.00	88.62	150.830	12,193.30	-9,402.27	5,493.58	10,889.54	0.55	0.29	-0.46
23,521.00	88.79	150.560	12,195.41	-9,483.35	5,539.09	10,982.50	0.34	0.18	-0.29
23,615.00	88.92	150.120	12,197.28	-9,565.01	5,585.60	11,076.48	0.49	0.14	-0.47
23,709.00	89.23	149.770	12,198.80	-9,646.36	5,632.67	11,170.47	0.50	0.33	-0.37
23,802.00	89.63	149.860	12,199.73	-9,726.75	5,679.43	11,263.46	0.44	0.43	0.10
23,895.00	88.62	149.590	12,201.15	-9,807.05	5,726.31	11,356.45	1.12	-1.09	-0.29
23,988.00	89.10	149.860	12,203.00	-9,887.35	5,773.18	11,449.43	0.59	0.52	0.29
24,081.00	88.48	149.420	12,204.96	-9,967.58	5,820.18	11,542.41	0.82	-0.67	-0.47
24,174.00	87.52	150.030	12,208.21	-10,047.85	5,867.04	11,635.35	1.22	-1.03	0.66
24,268.00	88.13	149.860	12,211.77	-10,129.15	5,914.08	11,729.28	0.67	0.65	-0.18



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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)	
24,359.00	88.70	149.330	12,214.29	-10,207.60	5,960.12	11,820.24	0.86	0.63	-0.58	
Survey @ 24359.00 MD 12214.29 TVD										
24,416.00	88.70	149.330	12,215.58	-10,256.62	5,989.19	11,877.23	0.00	0.00	0.00	
Survey Proj. to 24416.00 MD 12215.58 TVD										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
15,506.00	12,004.65	-2,530.64	1,568.02	Tie into sidetrack 01 @ 15506 MD	
24,359.00	12,214.29	-10,207.60	5,960.12	Survey @ 24359.00 MD 12214.29 TVD	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

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 °

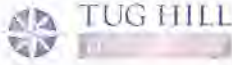
Well	Breckenridge S-20 HU (slot T)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,141.688 usft	Latitude:	39.830253590
	+E/-W	0.00 ft	Easting:	1,745,255.228 usft	Longitude:	-80.626568190
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,370.00 ft

Wellbore	Sidetrack 02				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	10/5/2022	-8.72	66.43	51,624.37942675

Design	Surveys Sidetrack 02				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	15,506.00
Vertical Section:		Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
		0.00	0.00	0.00	149.713

Survey Program	Date	10/21/2022			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
214.50	1,163.50	MWD surf (Original Hole)	MWD	MWD - Standard	
1,211.50	2,993.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,045.50	5,859.50	MWD 3045.5-5859.5 MD (Original Hole)	MWD	MWD - Standard	
5,900.00	10,845.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
10,961.00	11,054.00	MWD (Original Hole)	MWD	MWD - Standard	
11,079.00	15,506.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard	
15,596.00	24,359.00	MWD ST2 (Sidetrack 02)	MWD	MWD - Standard	
24,416.00	24,416.00	Projection (Sidetrack 02)	MWD	MWD - Standard	

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	0.000	0.00	0.00	0.00	14,465,141.688	1,745,255.228	39.830253590	-80.626568190	
214.50	0.18	144.480	214.50	-0.27	0.20	14,465,141.414	1,745,255.424	39.830252835	-80.626567497	
245.50	0.11	42.990	245.50	-0.29	0.24	14,465,141.396	1,745,255.473	39.830252786	-80.626567324	
273.50	0.17	46.490	273.50	-0.24	0.29	14,465,141.444	1,745,255.521	39.830252917	-80.626567151	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
302.50	0.15	48.000	302.50	-0.19	0.35	14,465,141.499	1,745,255.580	39.830253068	-80.626566939
330.50	0.17	23.310	330.50	-0.13	0.40	14,465,141.562	1,745,255.624	39.830253240	-80.626566782
362.50	0.21	324.750	362.50	-0.03	0.38	14,465,141.653	1,745,255.609	39.830253491	-80.626566834
394.50	0.26	8.330	394.50	0.09	0.36	14,465,141.773	1,745,255.586	39.830253820	-80.626566916
424.50	0.30	349.160	424.50	0.23	0.35	14,465,141.918	1,745,255.581	39.830254217	-80.626566931
456.50	0.12	123.870	456.50	0.29	0.36	14,465,141.981	1,745,255.593	39.830254391	-80.626566887
488.50	0.23	357.560	488.50	0.34	0.39	14,465,142.027	1,745,255.618	39.830254516	-80.626566797
520.50	0.34	326.270	520.50	0.48	0.33	14,465,142.170	1,745,255.563	39.830254910	-80.626566992
551.50	0.34	33.400	551.50	0.64	0.33	14,465,142.323	1,745,255.562	39.830255331	-80.626566992
583.50	0.54	12.590	583.50	0.86	0.42	14,465,142.550	1,745,255.647	39.830255952	-80.626566685
615.50	0.62	357.490	615.49	1.18	0.44	14,465,142.870	1,745,255.672	39.830256830	-80.626566590
647.50	0.74	338.480	647.49	1.55	0.36	14,465,143.235	1,745,255.589	39.830257834	-80.626566882
678.50	0.67	358.780	678.49	1.91	0.28	14,465,143.602	1,745,255.512	39.830258844	-80.626567152
710.50	1.01	347.910	710.49	2.38	0.22	14,465,144.065	1,745,255.449	39.830260116	-80.626567369
742.50	0.93	2.950	742.48	2.91	0.17	14,465,144.600	1,745,255.403	39.830261586	-80.626567524
773.50	1.44	355.180	773.48	3.55	0.16	14,465,145.240	1,745,255.383	39.830263342	-80.626567585
805.50	0.79	6.060	805.47	4.17	0.14	14,465,145.860	1,745,255.373	39.830265045	-80.626567613
837.50	0.60	7.450	837.47	4.56	0.19	14,465,146.245	1,745,255.418	39.830266103	-80.626567447
869.50	0.12	329.430	869.47	4.75	0.19	14,465,146.440	1,745,255.422	39.830266639	-80.626567428
901.50	0.19	37.620	901.47	4.82	0.21	14,465,146.511	1,745,255.438	39.830266833	-80.626567372
932.50	0.17	36.980	932.47	4.90	0.27	14,465,146.589	1,745,255.497	39.830267045	-80.626567161
964.50	0.22	7.580	964.47	5.00	0.31	14,465,146.687	1,745,255.534	39.830267316	-80.626567029
996.50	0.41	25.830	996.47	5.16	0.36	14,465,146.851	1,745,255.592	39.830267766	-80.626567620
1,059.50	0.64	8.830	1,059.46	5.72	0.50	14,465,147.404	1,745,255.732	39.830269281	-80.626566312
1,122.50	0.73	8.380	1,122.46	6.46	0.60	14,465,148.150	1,745,255.832	39.830271329	-80.626565944
1,163.50	0.79	31.650	1,163.45	6.96	0.79	14,465,148.649	1,745,256.018	39.830272698	-80.626565273
1,211.50	0.52	33.930	1,211.45	7.42	1.09	14,465,149.111	1,745,256.313	39.830273964	-80.626564214
1,243.50	0.62	21.970	1,243.45	7.70	1.23	14,465,149.392	1,745,256.459	39.830274734	-80.626563691
1,274.50	0.74	25.790	1,274.45	8.04	1.38	14,465,149.728	1,745,256.609	39.830275655	-80.626563152
1,306.50	1.01	35.520	1,306.44	8.46	1.63	14,465,150.144	1,745,256.863	39.830276793	-80.626562242
1,337.50	1.10	39.950	1,337.44	8.91	1.98	14,465,150.594	1,745,257.213	39.830278026	-80.626560989
1,369.50	1.36	40.050	1,369.43	9.43	2.43	14,465,151.120	1,745,257.654	39.830279466	-80.626559409
1,401.50	1.53	36.310	1,401.42	10.07	2.92	14,465,151.755	1,745,258.152	39.830281204	-80.626557628
1,432.50	1.39	43.730	1,432.41	10.67	3.43	14,465,152.361	1,745,258.657	39.830282860	-80.626555820
1,464.50	1.28	48.980	1,464.40	11.19	3.97	14,465,152.876	1,745,259.195	39.830284268	-80.626553896
1,495.50	1.15	39.980	1,495.40	11.65	4.43	14,465,153.341	1,745,259.656	39.830285542	-80.626552247
1,527.50	0.89	48.800	1,527.39	12.06	4.82	14,465,153.751	1,745,260.049	39.830286663	-80.626550840
1,558.50	0.60	65.620	1,558.39	12.29	5.15	14,465,153.977	1,745,260.378	39.830287278	-80.626549665
1,590.50	0.31	113.070	1,590.39	12.32	5.38	14,465,154.012	1,745,260.610	39.830287372	-80.626548837
1,622.50	0.43	151.830	1,622.39	12.18	5.52	14,465,153.872	1,745,260.747	39.830286987	-80.626548353
1,654.50	0.38	155.370	1,654.39	11.98	5.62	14,465,153.670	1,745,260.847	39.830286430	-80.626547997
1,686.50	0.39	194.190	1,686.38	11.78	5.64	14,465,153.468	1,745,260.865	39.830285875	-80.626547937
1,717.50	0.31	213.680	1,717.38	11.61	5.56	14,465,153.296	1,745,260.793	39.830285404	-80.626548198
1,749.50	0.24	248.360	1,749.38	11.51	5.45	14,465,153.199	1,745,260.682	39.830285139	-80.626548592
1,780.50	0.28	269.990	1,780.38	11.49	5.32	14,465,153.175	1,745,260.546	39.830285075	-80.626549077
1,812.50	0.36	280.910	1,812.38	11.51	5.14	14,465,153.194	1,745,260.369	39.830285129	-80.626549707
1,843.50	0.51	291.250	1,843.38	11.57	4.92	14,465,153.262	1,745,260.145	39.830285320	-80.626550505
1,875.50	0.62	283.160	1,875.38	11.67	4.62	14,465,153.353	1,745,259.844	39.830285573	-80.626551577
1,907.50	0.81	284.580	1,907.38	11.76	4.23	14,465,153.450	1,745,259.456	39.830285842	-80.626552955
1,939.50	0.98	280.910	1,939.37	11.87	3.74	14,465,153.558	1,745,258.969	39.830286146	-80.626554691
1,970.50	0.89	262.320	1,970.37	11.89	3.24	14,465,153.576	1,745,258.470	39.830286201	-80.626556467
2,001.50	1.10	239.570	2,001.37	11.71	2.75	14,465,153.394	1,745,257.975	39.830285705	-80.626558234
2,033.50	1.50	223.000	2,033.36	11.24	2.20	14,465,152.932	1,745,257.424	39.830284443	-80.626560202
2,064.50	1.50	215.090	2,064.35	10.61	1.69	14,465,152.303	1,745,256.914	39.830282722	-80.626562027



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,096.50	1.52	209.520	2,096.34	9.90	1.24	14,465,151.591	1,745,256.464	39.830280772	-80.626563640
2,128.50	1.03	203.490	2,128.33	9.27	0.91	14,465,150.958	1,745,256.141	39.830279037	-80.626564803
2,159.50	1.07	180.260	2,159.32	8.72	0.80	14,465,150.413	1,745,256.028	39.830277541	-80.626565211
2,191.50	0.93	173.210	2,191.32	8.17	0.83	14,465,149.856	1,745,256.057	39.830276012	-80.626565115
2,222.50	0.97	162.010	2,222.31	7.67	0.94	14,465,149.357	1,745,256.168	39.830274640	-80.626564728
2,254.50	1.09	150.510	2,254.31	7.15	1.17	14,465,148.834	1,745,256.402	39.830273202	-80.626563904
2,286.50	1.22	146.800	2,286.30	6.60	1.51	14,465,148.284	1,745,256.738	39.830271688	-80.626562714
2,317.50	1.20	146.030	2,317.30	6.05	1.87	14,465,147.739	1,745,257.100	39.830270186	-80.626561433
2,349.50	1.21	134.630	2,349.29	5.54	2.30	14,465,147.224	1,745,257.528	39.830268766	-80.626559917
2,381.50	1.08	143.300	2,381.28	5.06	2.72	14,465,146.745	1,745,257.949	39.830267445	-80.626558426
2,413.50	1.22	123.810	2,413.28	4.63	3.18	14,465,146.313	1,745,258.412	39.830266256	-80.626556782
2,444.50	1.03	131.480	2,444.27	4.26	3.67	14,465,145.945	1,745,258.895	39.830265239	-80.626555067
2,476.50	0.92	122.970	2,476.26	3.93	4.10	14,465,145.615	1,745,259.326	39.830264327	-80.626553537
2,507.50	0.75	129.890	2,507.26	3.66	4.46	14,465,145.349	1,745,259.690	39.830263593	-80.626552243
2,539.50	0.68	122.750	2,539.26	3.42	4.78	14,465,145.112	1,745,260.011	39.830262939	-80.626551105
2,571.50	0.48	131.890	2,571.26	3.23	5.04	14,465,144.920	1,745,260.270	39.830262408	-80.626550183
2,602.50	0.17	170.870	2,602.26	3.10	5.15	14,465,144.788	1,745,260.374	39.830262044	-80.626549815
2,634.50	0.15	190.710	2,634.26	3.01	5.15	14,465,144.700	1,745,260.374	39.830261802	-80.626549817
2,665.50	0.29	274.630	2,665.26	2.98	5.06	14,465,144.666	1,745,260.288	39.830261711	-80.626550123
2,697.50	0.44	312.420	2,697.26	3.07	4.89	14,465,144.756	1,745,260.117	39.830261959	-80.626550732
2,729.50	0.57	312.980	2,729.25	3.26	4.68	14,465,144.947	1,745,259.910	39.830262487	-80.626551467
2,759.50	0.53	311.700	2,759.25	3.45	4.47	14,465,145.141	1,745,259.697	39.830263022	-80.626552222
2,791.50	0.80	311.720	2,791.25	3.70	4.19	14,465,145.388	1,745,259.420	39.830263704	-80.626553206
2,823.50	0.85	332.480	2,823.25	4.06	3.91	14,465,145.747	1,745,259.143	39.830264693	-80.626554186
2,855.50	0.91	335.690	2,855.24	4.50	3.70	14,465,146.189	1,745,258.929	39.830265910	-80.626554942
2,886.50	0.97	338.030	2,886.24	4.97	3.50	14,465,146.657	1,745,258.729	39.830267196	-80.626555646
2,918.50	1.05	340.100	2,918.23	5.50	3.30	14,465,147.184	1,745,258.528	39.830268646	-80.626556354
2,950.50	1.17	340.140	2,950.23	6.08	3.09	14,465,147.767	1,745,258.317	39.830270249	-80.626557097
2,993.50	1.58	348.010	2,993.22	7.07	2.82	14,465,148.760	1,745,258.045	39.830272978	-80.626558052
3,045.50	1.89	345.820	3,045.19	8.60	2.46	14,465,150.292	1,745,257.686	39.830277191	-80.626559308
3,077.50	2.08	352.290	3,077.17	9.69	2.25	14,465,151.379	1,745,257.479	39.830280179	-80.626560029
3,109.50	1.85	355.260	3,109.15	10.78	2.13	14,465,152.470	1,745,257.358	39.830283175	-80.626560443
3,141.50	1.09	357.630	3,141.14	11.60	2.07	14,465,153.289	1,745,257.303	39.830285424	-80.626560627
3,172.50	0.23	350.750	3,172.14	11.96	2.05	14,465,153.645	1,745,257.281	39.830286402	-80.626560701
3,204.50	0.32	179.780	3,204.14	11.93	2.04	14,465,153.619	1,745,257.271	39.830286331	-80.626560737
3,236.50	0.63	182.360	3,236.14	11.67	2.04	14,465,153.353	1,745,257.264	39.830285603	-80.626560766
3,268.50	0.88	185.620	3,268.14	11.25	2.00	14,465,152.933	1,745,257.233	39.830284449	-80.626560883
3,300.50	1.04	192.190	3,300.13	10.72	1.92	14,465,152.405	1,745,257.147	39.830282999	-80.626561195
3,331.50	1.13	190.980	3,331.13	10.14	1.80	14,465,151.830	1,745,257.030	39.830281421	-80.626561623
3,363.50	1.23	195.200	3,363.12	9.50	1.65	14,465,151.188	1,745,256.880	39.830279662	-80.626562167
3,394.50	1.28	196.440	3,394.11	8.85	1.47	14,465,150.535	1,745,256.694	39.830277870	-80.626562837
3,426.50	1.25	198.600	3,426.11	8.17	1.25	14,465,149.862	1,745,256.482	39.830276023	-80.626563604
3,457.50	1.20	198.520	3,457.10	7.55	1.04	14,465,149.233	1,745,256.271	39.830274300	-80.626564369
3,489.50	1.22	200.580	3,489.09	6.91	0.82	14,465,148.597	1,745,256.045	39.830272554	-80.626565174
3,521.50	1.14	200.710	3,521.08	6.29	0.58	14,465,147.980	1,745,255.812	39.830270863	-80.626566016
3,552.50	0.53	213.600	3,552.08	5.88	0.40	14,465,147.572	1,745,255.624	39.830269745	-80.626566693
3,584.50	0.66	340.960	3,584.08	5.94	0.25	14,465,147.623	1,745,255.482	39.830269887	-80.626567198
3,615.50	1.42	359.750	3,615.07	6.49	0.19	14,465,148.176	1,745,255.422	39.830271406	-80.626567404
3,647.50	1.87	343.000	3,647.06	7.41	0.22	14,465,149.094	1,745,255.452	39.830273925	-80.626567285
3,679.50	2.29	5.610	3,679.04	8.56	0.32	14,465,150.251	1,745,255.545	39.830277103	-80.626566934
3,710.50	2.53	8.030	3,710.01	9.86	0.47	14,465,151.545	1,745,255.701	39.830280654	-80.626566358
3,742.50	2.71	7.900	3,741.98	11.31	0.68	14,465,152.994	1,745,255.904	39.830284630	-80.626565615
3,773.50	2.79	7.890	3,772.94	12.78	0.88	14,465,154.467	1,745,256.108	39.830288674	-80.626564866
3,804.50	2.42	11.230	3,803.91	14.17	1.11	14,465,155.856	1,745,256.339	39.830292486	-80.626564022



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,835.50	1.71	7.580	3,834.89	15.27	1.30	14,465,156.957	1,745,256.528	39.830295506	-80.626563334
3,867.50	1.45	5.790	3,866.88	16.14	1.40	14,465,157.833	1,745,256.632	39.830297911	-80.626562951
3,899.50	1.38	4.290	3,898.87	16.93	1.47	14,465,158.620	1,745,256.701	39.830300072	-80.626562692
3,929.50	1.38	4.050	3,928.86	17.65	1.53	14,465,159.340	1,745,256.754	39.830302050	-80.626562494
3,961.50	1.39	0.040	3,960.85	18.42	1.55	14,465,160.113	1,745,256.781	39.830304171	-80.626562384
3,993.50	1.61	359.180	3,992.84	19.26	1.55	14,465,160.950	1,745,256.775	39.830306471	-80.626562394
4,024.50	1.63	359.260	4,023.83	20.14	1.54	14,465,161.827	1,745,256.763	39.830308878	-80.626562423
4,055.50	1.93	358.010	4,054.81	21.10	1.51	14,465,162.789	1,745,256.739	39.830311522	-80.626562494
4,087.50	2.42	359.120	4,086.79	22.32	1.48	14,465,164.003	1,745,256.710	39.830314856	-80.626562579
4,119.50	2.90	0.700	4,118.76	23.80	1.48	14,465,165.488	1,745,256.710	39.830318934	-80.626562559
4,150.50	3.28	359.930	4,149.71	25.47	1.49	14,465,167.159	1,745,256.718	39.830323523	-80.626562504
4,182.50	3.55	1.370	4,181.65	27.38	1.51	14,465,169.065	1,745,256.741	39.830328757	-80.626562395
4,213.50	3.83	0.380	4,212.59	29.37	1.54	14,465,171.060	1,745,256.771	39.830334234	-80.626562259
4,245.50	3.69	354.860	4,244.52	31.47	1.46	14,465,173.154	1,745,256.686	39.830339987	-80.626562532
4,277.50	3.12	349.750	4,276.46	33.35	1.21	14,465,175.037	1,745,256.438	39.830345159	-80.626563384
4,308.50	3.01	345.340	4,307.42	34.97	0.85	14,465,176.654	1,745,256.082	39.830349606	-80.626564628
4,340.50	3.19	345.700	4,339.37	36.64	0.42	14,465,178.330	1,745,255.650	39.830354212	-80.626566144
4,372.50	3.44	344.280	4,371.32	38.43	-0.06	14,465,180.117	1,745,255.170	39.830359125	-80.626567827
4,404.50	3.74	347.030	4,403.26	40.37	-0.55	14,465,182.058	1,745,254.675	39.830364462	-80.626569559
4,435.50	3.67	348.160	4,434.19	42.33	-0.98	14,465,184.014	1,745,254.245	39.830369839	-80.626571064
4,467.50	3.37	352.760	4,466.13	44.26	-1.31	14,465,185.950	1,745,253.916	39.830375158	-80.626572206
4,498.50	3.22	357.070	4,497.08	46.04	-1.47	14,465,187.723	1,745,253.757	39.830380030	-80.626572747
4,530.50	3.26	359.980	4,529.03	47.84	-1.52	14,465,189.531	1,745,253.711	39.830384994	-80.626572885
4,562.50	3.48	1.430	4,560.97	49.72	-1.49	14,465,191.411	1,745,253.734	39.830390158	-80.626572772
4,594.50	3.78	1.510	4,592.91	51.75	-1.44	14,465,193.437	1,745,253.787	39.830395720	-80.626572556
4,626.50	3.59	4.890	4,624.84	53.80	-1.33	14,465,195.489	1,745,253.900	39.830401356	-80.626572122
4,658.50	3.01	5.330	4,656.79	55.64	-1.17	14,465,197.324	1,745,254.063	39.830406392	-80.626571513
4,689.50	2.97	7.670	4,687.75	57.24	-0.98	14,465,198.930	1,745,254.246	39.830410802	-80.626570838
4,721.50	2.78	10.870	4,719.71	58.83	-0.73	14,465,200.514	1,745,254.503	39.830415148	-80.626569899
4,753.50	2.15	16.380	4,751.68	60.16	-0.41	14,465,201.852	1,745,254.819	39.830418819	-80.626568755
4,785.50	1.77	15.560	4,783.66	61.22	-0.11	14,465,202.904	1,745,255.120	39.830421704	-80.626567664
4,816.50	1.24	11.610	4,814.65	62.01	0.09	14,465,203.694	1,745,255.316	39.830423871	-80.626566954
4,848.50	1.12	7.270	4,846.64	62.66	0.20	14,465,204.343	1,745,255.426	39.830425653	-80.626566556
4,879.50	1.18	356.340	4,877.64	63.27	0.22	14,465,204.962	1,745,255.444	39.830427353	-80.626566482
4,911.50	1.17	356.950	4,909.63	63.93	0.18	14,465,205.617	1,745,255.405	39.830429152	-80.626566610
4,943.50	0.79	347.870	4,941.62	64.47	0.11	14,465,206.159	1,745,255.341	39.830430641	-80.626566829
4,975.50	0.50	323.980	4,973.62	64.80	-0.02	14,465,206.488	1,745,255.213	39.830431545	-80.626567281
5,007.50	0.31	292.790	5,005.62	64.95	-0.18	14,465,206.634	1,745,255.051	39.830431949	-80.626567856
5,039.50	0.35	271.860	5,037.62	64.98	-0.35	14,465,206.671	1,745,254.874	39.830432052	-80.626568487
5,070.50	0.44	256.300	5,068.62	64.96	-0.56	14,465,206.646	1,745,254.663	39.830431985	-80.626569237
5,102.50	0.41	246.630	5,100.62	64.88	-0.79	14,465,206.571	1,745,254.439	39.830431783	-80.626570037
5,133.50	0.51	250.410	5,131.62	64.79	-1.02	14,465,206.481	1,745,254.207	39.830431538	-80.626570864
5,165.50	0.64	236.450	5,163.62	64.65	-1.30	14,465,206.335	1,745,253.924	39.830431139	-80.626571875
5,197.50	0.62	234.560	5,195.61	64.45	-1.59	14,465,206.135	1,745,253.634	39.830430595	-80.626572911
5,228.50	0.67	241.610	5,226.61	64.26	-1.89	14,465,205.952	1,745,253.338	39.830430095	-80.626573968
5,260.50	0.72	233.490	5,258.61	64.06	-2.22	14,465,205.743	1,745,253.012	39.830429526	-80.626575133
5,292.50	0.91	239.670	5,290.61	63.80	-2.60	14,465,205.492	1,745,252.633	39.830428839	-80.626576486
5,323.50	0.98	241.220	5,321.60	63.55	-3.04	14,465,205.236	1,745,252.190	39.830428142	-80.626578066
5,355.50	0.80	236.240	5,353.60	63.29	-3.46	14,465,204.980	1,745,251.765	39.830427444	-80.626579586
5,385.50	0.67	237.340	5,383.60	63.08	-3.79	14,465,204.769	1,745,251.443	39.830426868	-80.626580735
5,417.50	0.49	237.170	5,415.59	62.91	-4.06	14,465,204.594	1,745,251.170	39.830426390	-80.626581708
5,449.50	0.15	237.480	5,447.59	62.81	-4.21	14,465,204.497	1,745,251.020	39.830426126	-80.626582245
5,480.50	0.18	193.630	5,478.59	62.74	-4.25	14,465,204.428	1,745,250.974	39.830425937	-80.626582409
5,512.50	0.20	222.210	5,510.59	62.65	-4.30	14,465,204.338	1,745,250.925	39.830425690	-80.626582586



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,544.50	0.11	173.810	5,542.59	62.58	-4.34	14,465,204.266	1,745,250.891	39.830425493	-80.626582709	
5,575.50	0.41	99.140	5,573.59	62.53	-4.22	14,465,204.219	1,745,251.004	39.830425362	-80.626582308	
5,607.50	0.68	96.440	5,605.59	62.49	-3.92	14,465,204.179	1,745,251.305	39.830425250	-80.626581234	
5,638.50	0.74	87.960	5,636.59	62.48	-3.54	14,465,204.166	1,745,251.688	39.830425209	-80.626579871	
5,670.50	1.04	88.250	5,668.59	62.49	-3.04	14,465,204.182	1,745,252.185	39.830425247	-80.626578101	
5,701.50	1.15	83.970	5,699.58	62.54	-2.45	14,465,204.223	1,745,252.775	39.830425354	-80.626575997	
5,733.50	1.05	91.950	5,731.57	62.56	-1.84	14,465,204.247	1,745,253.388	39.830425412	-80.626573815	
5,764.50	0.81	95.870	5,762.57	62.53	-1.34	14,465,204.215	1,745,253.890	39.830425318	-80.626572028	
5,796.50	0.76	95.680	5,794.57	62.48	-0.90	14,465,204.171	1,745,254.326	39.830425192	-80.626570475	
5,827.50	0.81	95.290	5,825.56	62.44	-0.48	14,465,204.130	1,745,254.749	39.830425076	-80.626568970	
5,859.50	0.82	92.340	5,857.56	62.41	-0.03	14,465,204.100	1,745,255.203	39.830424988	-80.626567353	
5,900.00	0.78	88.260	5,898.06	62.41	0.54	14,465,204.097	1,745,255.768	39.830424972	-80.626565340	
5,993.00	1.09	103.030	5,991.04	62.23	2.03	14,465,203.916	1,745,257.262	39.830424460	-80.626560020	
6,087.00	1.31	107.900	6,085.02	61.70	3.93	14,465,203.385	1,745,259.156	39.830422978	-80.626553283	
6,180.00	0.77	96.060	6,178.01	61.30	5.56	14,465,202.992	1,745,260.789	39.830421880	-80.626547472	
6,273.00	0.68	69.030	6,271.00	61.44	6.70	14,465,203.123	1,745,261.926	39.830422228	-80.626543421	
6,367.00	0.25	266.430	6,365.00	61.62	7.01	14,465,203.310	1,745,262.242	39.830422738	-80.626542292	
6,460.00	0.73	281.310	6,458.00	61.73	6.23	14,465,203.414	1,745,261.458	39.830423031	-80.626545081	
6,553.00	1.11	285.130	6,550.98	62.08	4.78	14,465,203.765	1,745,260.008	39.830424013	-80.626550243	
6,646.00	0.33	316.660	6,643.98	62.51	3.73	14,465,204.195	1,745,258.954	39.830425205	-80.626553988	
6,739.00	0.15	69.150	6,736.98	62.75	3.66	14,465,204.433	1,745,258.884	39.830425860	-80.626554234	
6,833.00	0.43	75.220	6,830.97	62.88	4.11	14,465,204.567	1,745,259.340	39.830426222	-80.626552608	
6,988.00	0.38	81.480	6,985.97	63.10	5.18	14,465,204.791	1,745,260.411	39.830426827	-80.626548791	
7,112.00	2.80	346.790	7,109.92	66.11	4.90	14,465,207.802	1,745,260.126	39.830435096	-80.626549763	
7,204.00	5.10	346.220	7,201.70	72.27	3.41	14,465,213.961	1,745,258.638	39.830452030	-80.626554971	
7,298.00	7.18	344.010	7,295.15	81.98	0.80	14,465,223.667	1,745,256.024	39.830478714	-80.626564136	
7,391.00	9.10	338.030	7,387.21	94.39	-3.56	14,465,236.076	1,745,251.671	39.830512841	-80.626579456	
7,484.00	11.12	332.420	7,478.77	109.16	-10.46	14,465,250.847	1,745,244.767	39.830553485	-80.626603830	
7,671.00	13.24	329.140	7,661.55	143.53	-29.80	14,465,285.218	1,745,225.431	39.830648096	-80.626672191	
7,764.00	13.39	331.270	7,752.05	162.12	-40.44	14,465,303.803	1,745,214.792	39.830699256	-80.626709810	
7,857.00	13.57	331.230	7,842.49	181.12	-50.86	14,465,322.809	1,745,204.365	39.830751571	-80.626746668	
8,046.00	14.40	328.920	8,025.88	220.69	-73.67	14,465,362.373	1,745,181.561	39.830860484	-80.626827308	
8,140.00	14.15	332.420	8,116.98	240.88	-85.02	14,465,382.568	1,745,170.207	39.830916074	-80.626867449	
8,233.00	13.82	337.130	8,207.23	261.19	-94.60	14,465,402.879	1,745,160.627	39.830971962	-80.626901271	
8,327.00	14.50	338.130	8,298.37	282.46	-103.35	14,465,424.145	1,745,151.880	39.831030462	-80.626932111	
8,420.00	14.66	336.890	8,388.38	304.09	-112.30	14,465,445.773	1,745,142.924	39.831089960	-80.626963691	
8,513.00	15.13	335.930	8,478.25	325.99	-121.87	14,465,467.679	1,745,133.355	39.831150228	-80.626997450	
8,606.00	15.50	334.720	8,567.95	348.31	-132.13	14,465,489.997	1,745,123.098	39.831211636	-80.627033653	
8,700.00	15.31	336.250	8,658.57	371.03	-142.49	14,465,512.714	1,745,112.736	39.831274139	-80.627070224	
8,794.00	14.29	337.690	8,749.45	393.12	-151.89	14,465,534.806	1,745,103.334	39.831334916	-80.627103386	
8,888.00	12.75	337.370	8,840.85	413.43	-160.29	14,465,555.114	1,745,094.938	39.831390782	-80.627132990	
8,981.00	11.79	341.420	8,931.72	431.91	-167.27	14,465,573.593	1,745,087.962	39.831441609	-80.627157565	
9,075.00	12.73	338.610	9,023.58	450.65	-174.10	14,465,592.340	1,745,081.124	39.831493170	-80.627181641	
9,168.00	13.46	337.160	9,114.16	470.17	-182.04	14,465,611.856	1,745,073.186	39.831546856	-80.627209628	
9,262.00	14.33	337.120	9,205.41	490.97	-190.81	14,465,632.656	1,745,064.416	39.831604078	-80.627240556	
9,354.00	15.88	337.680	9,294.23	513.10	-200.02	14,465,654.790	1,745,055.209	39.831664970	-80.627273023	
9,447.00	15.85	336.370	9,383.69	536.51	-209.94	14,465,678.196	1,745,045.286	39.831729360	-80.627308020	
9,540.00	15.20	337.940	9,473.29	559.44	-219.61	14,465,701.130	1,745,035.617	39.831792454	-80.627342123	
9,634.00	14.64	338.880	9,564.12	581.95	-228.52	14,465,723.632	1,745,026.708	39.831854351	-80.627373521	
9,726.00	14.90	337.380	9,653.08	603.71	-237.26	14,465,745.396	1,745,017.970	39.831914219	-80.627404325	
9,819.00	16.26	337.670	9,742.66	626.79	-246.81	14,465,768.478	1,745,008.424	39.831977715	-80.627437985	
9,913.00	15.66	337.630	9,833.04	650.70	-256.63	14,465,792.383	1,744,998.595	39.832043476	-80.627472639	
10,006.00	14.28	336.170	9,922.88	672.80	-266.05	14,465,814.483	1,744,989.184	39.832104275	-80.627505835	
10,100.00	13.08	335.480	10,014.21	693.08	-275.14	14,465,834.766	1,744,980.085	39.832160080	-80.627537943	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,193.00	11.51	335.770	10,105.08	711.12	-283.32	14,465,852.802	1,744,971.909	39.832209706	-80.627566797
10,286.00	10.16	336.900	10,196.42	727.12	-290.35	14,465,868.809	1,744,964.883	39.832253744	-80.627591588
10,379.00	9.21	334.960	10,288.09	741.41	-296.71	14,465,883.097	1,744,958.515	39.832293056	-80.627614060
10,472.00	7.65	337.770	10,380.08	753.88	-302.21	14,465,895.571	1,744,953.022	39.832327374	-80.627633439
10,566.00	6.26	335.490	10,473.39	764.34	-306.70	14,465,906.026	1,744,948.529	39.832356138	-80.627649289
10,659.00	4.54	329.490	10,565.97	772.12	-310.67	14,465,913.811	1,744,944.557	39.832377563	-80.627663323
10,752.00	3.16	326.610	10,658.76	777.44	-313.95	14,465,919.123	1,744,941.277	39.832392187	-80.627674926
10,845.00	2.42	325.290	10,751.65	781.19	-316.48	14,465,922.877	1,744,938.748	39.832402526	-80.627683878
10,961.00	2.51	328.630	10,867.54	785.37	-319.20	14,465,927.059	1,744,936.032	39.832414042	-80.627693493
11,054.00	1.49	328.980	10,960.49	788.15	-320.88	14,465,929.834	1,744,934.348	39.832421682	-80.627699447
11,079.00	1.41	327.270	10,985.48	788.69	-321.21	14,465,930.371	1,744,934.015	39.832423161	-80.627700628
11,126.00	0.71	283.650	11,032.47	789.24	-321.81	14,465,930.927	1,744,933.419	39.832424692	-80.627702742
11,173.00	0.66	227.950	11,079.47	789.13	-322.29	14,465,930.814	1,744,932.935	39.832424389	-80.627704468
11,220.00	1.19	185.910	11,126.46	788.46	-322.55	14,465,930.147	1,744,932.684	39.832422561	-80.627705372
11,265.00	1.41	181.810	11,171.45	787.44	-322.61	14,465,929.129	1,744,932.618	39.832419765	-80.627705621
11,329.00	3.89	149.730	11,235.38	784.78	-321.54	14,465,926.467	1,744,933.688	39.832412441	-80.627701851
11,376.00	9.19	147.260	11,282.06	780.24	-318.71	14,465,921.930	1,744,936.523	39.832399949	-80.627691818
11,423.00	16.00	146.330	11,327.90	771.69	-313.08	14,465,913.372	1,744,942.151	39.832376383	-80.627671899
11,471.00	20.33	149.550	11,373.50	758.99	-305.18	14,465,900.672	1,744,950.048	39.832341416	-80.627643958
11,518.00	22.76	153.030	11,417.21	743.84	-296.92	14,465,885.528	1,744,958.311	39.832299733	-80.627614751
11,565.00	25.54	151.840	11,460.09	726.80	-288.01	14,465,868.489	1,744,967.217	39.832252839	-80.627583279
11,612.00	29.87	151.050	11,501.70	707.62	-277.56	14,465,849.306	1,744,977.669	39.832200039	-80.627546334
11,659.00	33.94	150.340	11,541.59	685.97	-265.40	14,465,827.654	1,744,989.832	39.832140439	-80.627503330
11,706.00	37.34	149.900	11,579.78	662.23	-251.75	14,465,803.914	1,745,003.477	39.832075087	-80.627455079
11,752.00	39.86	148.890	11,615.73	637.53	-237.14	14,465,779.219	1,745,018.092	39.832007104	-80.627403386
11,799.00	42.69	148.540	11,651.05	611.04	-221.04	14,465,752.727	1,745,034.193	39.831934166	-80.627346427
11,844.00	45.07	148.540	11,683.48	584.44	-204.76	14,465,726.122	1,745,050.471	39.831860918	-80.627288840
11,891.00	47.95	149.200	11,715.82	555.25	-187.14	14,465,696.936	1,745,068.093	39.831780562	-80.627226504
11,937.00	50.60	149.510	11,745.83	525.26	-169.37	14,465,666.945	1,745,085.859	39.831697998	-80.627163667
11,984.00	52.98	149.370	11,774.90	493.46	-150.59	14,465,635.147	1,745,104.635	39.831610460	-80.627097259
12,031.00	55.33	149.590	11,802.42	460.64	-131.25	14,465,602.329	1,745,123.981	39.831520113	-80.627028838
12,078.00	57.53	150.830	11,828.41	426.66	-111.80	14,465,568.344	1,745,143.430	39.831426559	-80.626960065
12,126.00	60.41	151.710	11,853.15	390.59	-92.03	14,465,532.278	1,745,163.195	39.831327289	-80.626890201
12,173.00	63.41	152.060	11,875.28	354.02	-72.50	14,465,495.710	1,745,182.731	39.831226642	-80.626821159
12,220.00	66.55	152.460	11,895.15	316.33	-52.68	14,465,458.020	1,745,202.550	39.831122909	-80.626751123
12,267.00	70.04	152.110	11,912.53	277.68	-32.37	14,465,419.369	1,745,222.857	39.831016533	-80.626679366
12,314.00	72.65	152.020	11,927.57	238.34	-11.51	14,465,380.031	1,745,243.717	39.830908262	-80.626605650
12,361.00	75.87	152.060	11,940.31	198.39	9.70	14,465,340.079	1,745,264.924	39.830798303	-80.626530706
12,408.00	80.03	152.190	11,950.12	157.77	31.18	14,465,299.456	1,745,286.409	39.830686499	-80.626454782
12,455.00	84.40	152.370	11,956.49	116.56	52.84	14,465,258.244	1,745,308.064	39.830573072	-80.626378262
12,503.00	88.42	152.280	11,959.49	74.14	75.08	14,465,215.827	1,745,330.309	39.830456332	-80.626299656
12,597.00	88.56	151.890	11,961.97	-8.89	119.07	14,465,132.794	1,745,374.301	39.830227800	-80.626144198
12,691.00	89.17	151.670	11,963.83	-91.70	163.51	14,465,049.984	1,745,418.741	39.829999875	-80.625987141
12,785.00	89.22	149.460	11,965.15	-173.56	209.70	14,464,968.131	1,745,464.928	39.829774560	-80.625823846
12,880.00	89.13	149.070	11,966.52	-255.20	258.25	14,464,886.484	1,745,513.474	39.829549781	-80.625652148
12,974.00	89.17	149.420	11,967.92	-335.98	306.31	14,464,805.713	1,745,561.537	39.829327414	-80.625482158
13,068.00	89.13	148.580	11,969.31	-416.54	354.72	14,464,725.149	1,745,609.945	39.829105611	-80.625310939
13,162.00	89.13	148.930	11,970.74	-496.90	403.47	14,464,644.793	1,745,658.697	39.828884374	-80.625138492
13,256.00	89.17	148.620	11,972.13	-577.27	452.19	14,464,564.419	1,745,707.421	39.828663089	-80.624966145
13,350.00	89.22	150.040	11,973.45	-658.11	500.14	14,464,483.578	1,745,755.364	39.828440530	-80.624796590
13,444.00	89.13	149.810	11,974.81	-739.45	547.24	14,464,402.242	1,745,802.465	39.828216621	-80.624630040
13,538.00	89.13	150.520	11,976.23	-820.98	594.00	14,464,320.710	1,745,849.225	39.827992179	-80.624464711
13,632.00	89.09	150.210	11,977.69	-902.67	640.47	14,464,239.016	1,745,895.700	39.827767294	-80.624300400
13,726.00	89.13	149.510	11,979.15	-983.95	687.67	14,464,157.736	1,745,942.892	39.827543535	-80.624133527



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
13,820.00	89.22	149.730	11,980.51	-1,065.04	735.20	14,464,076.651	1,745,990.426	39.827320311	-80.623965437	
13,914.00	89.09	149.070	11,981.89	-1,145.94	783.04	14,463,995.751	1,746,038.270	39.827097589	-80.623796240	
14,008.00	89.13	149.860	11,983.35	-1,226.89	830.80	14,463,914.798	1,746,086.022	39.826874722	-80.623627373	
14,102.00	89.13	149.510	11,984.78	-1,308.03	878.24	14,463,833.660	1,746,133.463	39.826651354	-80.623459617	
14,197.00	89.17	149.590	11,986.19	-1,389.92	926.38	14,463,751.773	1,746,181.603	39.826425916	-80.623289387	
14,291.00	89.17	149.550	11,987.55	-1,470.96	973.98	14,463,670.730	1,746,229.207	39.826202805	-80.623121050	
14,387.00	89.26	149.730	11,988.87	-1,553.79	1,022.50	14,463,587.903	1,746,277.724	39.825974782	-80.622949492	
14,480.00	89.22	150.650	11,990.10	-1,634.47	1,068.73	14,463,507.217	1,746,323.952	39.825752665	-80.622786055	
14,574.00	89.26	149.460	11,991.35	-1,715.92	1,115.64	14,463,425.774	1,746,370.869	39.825528463	-80.622620176	
14,667.00	89.22	151.140	11,992.58	-1,796.69	1,161.71	14,463,345.002	1,746,416.941	39.825306110	-80.622457299	
14,760.00	89.13	150.870	11,993.92	-1,878.03	1,206.79	14,463,263.667	1,746,462.016	39.825082224	-80.622297979	
14,853.00	89.22	150.700	11,995.26	-1,959.19	1,252.18	14,463,182.506	1,746,507.403	39.824858811	-80.622137547	
14,946.00	89.17	151.180	11,996.57	-2,040.47	1,297.35	14,463,101.222	1,746,552.571	39.824635064	-80.621977900	
15,039.00	89.17	151.090	11,997.91	-2,121.91	1,342.24	14,463,019.785	1,746,597.462	39.824410899	-80.621819243	
15,133.00	89.13	151.140	11,999.31	-2,204.20	1,387.64	14,462,937.488	1,746,642.864	39.824184369	-80.621658779	
15,227.00	89.26	151.310	12,000.63	-2,286.59	1,432.88	14,462,855.104	1,746,688.108	39.823957598	-80.621498879	
15,320.00	89.13	151.050	12,001.94	-2,368.06	1,477.71	14,462,773.632	1,746,732.935	39.823733336	-80.621340453	
15,413.00	89.22	151.090	12,003.27	-2,449.45	1,522.69	14,462,692.245	1,746,777.918	39.823509309	-80.621181470	
15,506.00	89.09	150.560	12,004.65	-2,530.64	1,568.02	14,462,611.053	1,746,823.249	39.823285810	-80.621021249	
Tie into sidetrack 01 @ 15506 MD										
15,596.00	88.40	150.300	12,006.62	-2,608.90	1,612.43	14,462,532.795	1,746,867.651	39.823070379	-80.620864288	
15,627.00	85.76	150.560	12,008.20	-2,635.82	1,627.70	14,462,505.870	1,746,882.928	39.822996260	-80.620810286	
15,657.00	83.60	149.680	12,010.98	-2,661.72	1,642.58	14,462,479.972	1,746,897.808	39.822924964	-80.620757682	
15,689.00	83.47	146.960	12,014.58	-2,688.78	1,659.28	14,462,452.916	1,746,914.505	39.822850468	-80.620698624	
15,720.00	85.89	144.060	12,017.46	-2,714.21	1,676.76	14,462,427.480	1,746,931.981	39.822780413	-80.620636765	
15,751.00	89.49	142.040	12,018.71	-2,738.96	1,695.37	14,462,402.732	1,746,950.597	39.822712233	-80.620570838	
15,781.00	91.74	141.770	12,018.38	-2,762.57	1,713.88	14,462,379.126	1,746,969.104	39.822647188	-80.620505283	
15,828.00	90.37	142.040	12,017.52	-2,799.55	1,742.87	14,462,342.144	1,746,998.096	39.822545292	-80.620402588	
15,875.00	91.47	144.940	12,016.76	-2,837.32	1,770.83	14,462,304.378	1,747,026.052	39.822441251	-80.620303592	
15,922.00	92.13	148.190	12,015.29	-2,876.51	1,796.71	14,462,265.181	1,747,051.932	39.822333306	-80.620212012	
15,968.00	90.29	148.980	12,014.32	-2,915.76	1,820.68	14,462,225.934	1,747,075.903	39.822225247	-80.620127237	
16,062.00	90.24	149.070	12,013.88	-2,996.35	1,869.06	14,462,145.340	1,747,124.280	39.822003355	-80.619956159	
16,155.00	89.93	149.070	12,013.74	-3,076.13	1,916.86	14,462,065.566	1,747,172.081	39.821783719	-80.619787125	
16,249.00	88.79	149.240	12,014.79	-3,156.83	1,965.05	14,461,984.868	1,747,220.273	39.821561542	-80.619616715	
16,343.00	88.53	149.240	12,016.99	-3,237.58	2,013.11	14,461,904.114	1,747,268.335	39.821339214	-80.619446767	
16,436.00	88.66	150.120	12,019.27	-3,317.83	2,060.05	14,461,823.860	1,747,315.269	39.821118270	-80.619280829	
16,530.00	88.66	149.680	12,021.47	-3,399.14	2,107.17	14,461,742.559	1,747,362.398	39.820894447	-80.619114216	
16,623.00	89.19	149.770	12,023.21	-3,479.44	2,154.05	14,461,662.257	1,747,409.276	39.820673373	-80.618948484	
16,715.00	89.01	149.860	12,024.66	-3,558.95	2,200.30	14,461,582.742	1,747,455.527	39.820454465	-80.618784971	
16,808.00	89.67	151.880	12,025.73	-3,640.18	2,245.57	14,461,501.515	1,747,500.793	39.820203869	-80.618624995	
16,902.00	89.54	152.320	12,026.38	-3,723.25	2,289.55	14,461,418.443	1,747,544.777	39.820002221	-80.618469612	
16,994.00	88.79	151.790	12,027.72	-3,804.52	2,332.66	14,461,337.180	1,747,587.885	39.819778550	-80.618317322	
17,087.00	89.19	152.500	12,029.36	-3,886.73	2,376.11	14,461,254.969	1,747,631.331	39.819552273	-80.618163847	
17,180.00	89.10	152.140	12,030.75	-3,969.07	2,419.30	14,461,172.622	1,747,674.528	39.819325623	-80.618011261	
17,273.00	87.91	152.500	12,033.17	-4,051.40	2,462.49	14,461,090.295	1,747,717.714	39.819099029	-80.617858713	
17,367.00	88.18	152.760	12,036.38	-4,134.83	2,505.68	14,461,006.867	1,747,760.903	39.818869410	-80.617706170	
17,460.00	88.13	153.110	12,039.37	-4,217.60	2,547.97	14,460,924.094	1,747,803.196	39.818641602	-80.617556812	
17,553.00	87.03	152.060	12,043.30	-4,300.08	2,590.75	14,460,841.615	1,747,845.977	39.818414593	-80.617405715	
17,646.00	87.47	152.230	12,047.76	-4,382.21	2,634.16	14,460,759.486	1,747,889.379	39.818188538	-80.617252397	
17,739.00	87.30	151.090	12,052.01	-4,463.98	2,678.26	14,460,677.719	1,747,933.480	39.817963470	-80.617096589	
17,833.00	87.56	151.000	12,056.22	-4,546.15	2,723.72	14,460,595.552	1,747,978.942	39.817737297	-80.616935941	
17,925.00	87.43	150.740	12,060.24	-4,626.43	2,768.46	14,460,515.265	1,748,023.684	39.817516277	-80.616777828	
18,018.00	89.23	150.470	12,062.95	-4,707.42	2,814.09	14,460,434.276	1,748,069.309	39.817293327	-80.616616580	
18,112.00	89.41	151.000	12,064.07	-4,789.42	2,860.04	14,460,352.280	1,748,115.258	39.817067606	-80.616454200	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
18,206.00	89.41	150.740	12,065.04	-4,871.52	2,905.79	14,460,270.174	1,748,161.013	39.816841586	-80.616292507
18,298.00	89.10	150.470	12,066.23	-4,951.67	2,950.94	14,460,190.025	1,748,206.166	39.816620949	-80.616132935
18,392.00	89.05	150.650	12,067.75	-5,033.52	2,997.14	14,460,108.174	1,748,252.362	39.816395624	-80.615869674
18,485.00	88.97	151.000	12,069.36	-5,114.71	3,042.47	14,460,026.985	1,748,297.690	39.816172127	-80.615809492
18,578.00	88.31	148.980	12,071.56	-5,195.22	3,088.97	14,459,946.480	1,748,344.188	39.815950494	-80.615645136
18,670.00	88.44	149.510	12,074.17	-5,274.25	3,135.99	14,459,867.451	1,748,391.215	39.815732908	-80.615478876
18,764.00	88.66	149.590	12,076.55	-5,355.26	3,183.62	14,459,786.443	1,748,438.837	39.815509879	-80.615310526
18,856.00	88.66	149.950	12,078.70	-5,434.72	3,229.92	14,459,706.976	1,748,485.144	39.815291098	-80.615146839
18,950.00	88.66	150.210	12,080.90	-5,516.17	3,276.80	14,459,625.526	1,748,532.017	39.815066866	-80.614981165
19,044.00	88.57	150.470	12,083.17	-5,597.83	3,323.30	14,459,543.867	1,748,578.520	39.814842061	-80.614816817
19,137.00	88.62	150.830	12,085.45	-5,678.87	3,368.87	14,459,462.829	1,748,624.089	39.814618974	-80.614655783
19,230.00	88.75	150.740	12,087.59	-5,760.02	3,414.25	14,459,381.680	1,748,669.469	39.814395586	-80.614495425
19,324.00	88.79	151.000	12,089.61	-5,842.11	3,460.00	14,459,299.589	1,748,715.217	39.814169604	-80.614333773
19,418.00	88.66	151.260	12,091.70	-5,924.41	3,505.37	14,459,217.292	1,748,760.591	39.813943062	-80.614173457
19,511.00	89.01	151.440	12,093.59	-6,006.00	3,549.95	14,459,135.696	1,748,805.171	39.813718452	-80.614015958
19,605.00	88.92	151.620	12,095.29	-6,088.62	3,594.75	14,459,053.077	1,748,849.974	39.813491032	-80.613857685
19,698.00	88.53	149.860	12,097.36	-6,169.73	3,640.20	14,458,971.966	1,748,895.416	39.813267746	-80.613697110
19,791.00	88.26	149.240	12,099.96	-6,249.88	3,687.31	14,458,891.826	1,748,942.528	39.813047104	-80.613530575
19,885.00	88.75	148.800	12,102.41	-6,330.44	3,735.68	14,458,811.263	1,748,990.897	39.812825287	-80.613359573
19,978.00	88.97	148.540	12,104.26	-6,409.86	3,784.02	14,458,731.840	1,749,039.244	39.812606600	-80.613188632
20,071.00	88.97	149.160	12,105.93	-6,489.44	3,832.12	14,458,652.262	1,749,087.343	39.812387491	-80.613018578
20,165.00	88.97	148.450	12,107.62	-6,569.83	3,880.80	14,458,571.868	1,749,136.022	39.812166131	-80.612846471
20,257.00	88.79	150.030	12,109.42	-6,648.87	3,927.84	14,458,492.828	1,749,183.065	39.811948513	-80.612680174
20,351.00	88.79	150.390	12,111.41	-6,730.43	3,974.54	14,458,411.269	1,749,229.755	39.811723977	-80.612515168
20,444.00	89.27	151.260	12,112.98	-6,811.62	4,019.86	14,458,330.080	1,749,275.084	39.811500476	-80.612355009
20,537.00	89.05	150.390	12,114.35	-6,892.81	4,065.19	14,458,248.888	1,749,320.414	39.811276966	-80.612194845
20,630.00	87.91	150.650	12,116.81	-6,973.74	4,110.94	14,458,167.959	1,749,366.164	39.811054172	-80.612033182
20,724.00	87.91	150.210	12,120.24	-7,055.45	4,157.30	14,458,086.257	1,749,412.521	39.810829248	-80.611869373
20,816.00	87.82	149.680	12,123.67	-7,135.02	4,203.35	14,458,006.683	1,749,458.565	39.810610171	-80.611706644
20,909.00	88.70	151.090	12,126.49	-7,215.83	4,249.28	14,457,925.872	1,749,504.499	39.810387699	-80.611544325
21,003.00	87.87	153.200	12,129.31	-7,298.90	4,293.18	14,457,842.806	1,749,548.397	39.810159059	-80.611389295
21,096.00	88.57	154.430	12,132.19	-7,382.31	4,334.20	14,457,759.393	1,749,589.414	39.809929499	-80.611244530
21,188.00	87.74	154.960	12,135.16	-7,465.44	4,373.50	14,457,676.265	1,749,628.718	39.809700743	-80.611105863
21,283.00	86.99	152.850	12,139.52	-7,550.66	4,415.24	14,457,591.045	1,749,670.457	39.809466210	-80.610958555
21,376.00	86.59	150.740	12,144.73	-7,632.48	4,459.12	14,457,509.221	1,749,714.340	39.809240979	-80.610803565
21,469.00	87.25	148.800	12,149.73	-7,712.72	4,505.87	14,457,428.988	1,749,761.093	39.809020085	-80.610638329
21,562.00	87.34	148.100	12,154.12	-7,791.88	4,554.48	14,457,349.824	1,749,809.700	39.808802102	-80.610466477
21,655.00	87.78	148.450	12,158.08	-7,870.91	4,603.34	14,457,270.792	1,749,858.558	39.808584479	-80.610293727
21,748.00	88.13	148.450	12,161.40	-7,950.11	4,651.97	14,457,191.590	1,749,907.189	39.808366390	-80.610121794
21,842.00	88.22	147.840	12,164.39	-8,029.92	4,701.56	14,457,111.789	1,749,956.774	39.808146644	-80.609946472
21,935.00	88.84	148.190	12,166.78	-8,108.77	4,750.80	14,457,032.934	1,750,006.019	39.807929502	-80.609772346
22,029.00	88.75	144.850	12,168.75	-8,187.15	4,802.64	14,456,954.559	1,750,057.855	39.807713647	-80.609589890
22,122.00	88.31	144.670	12,171.14	-8,263.08	4,856.28	14,456,878.627	1,750,111.498	39.807504479	-80.609399161
22,215.00	90.51	148.630	12,172.10	-8,340.74	4,907.39	14,456,800.966	1,750,162.608	39.807290591	-80.609218379
22,309.00	90.02	151.260	12,171.66	-8,422.09	4,954.46	14,456,719.613	1,750,209.681	39.807066614	-80.609052031
22,403.00	88.97	152.140	12,172.49	-8,504.85	4,999.03	14,456,636.854	1,750,254.243	39.806838803	-80.608894649
22,497.00	89.23	152.140	12,173.97	-8,587.95	5,042.95	14,456,553.760	1,750,298.165	39.806610081	-80.608739550
22,590.00	89.56	152.320	12,174.95	-8,670.23	5,086.28	14,456,471.476	1,750,341.493	39.806383591	-80.608586554
22,683.00	88.48	152.060	12,176.54	-8,752.48	5,129.66	14,456,389.231	1,750,384.874	39.806157207	-80.608433370
22,777.00	88.26	150.210	12,179.21	-8,834.76	5,175.01	14,456,306.946	1,750,430.232	39.805930691	-80.608273149
22,871.00	88.57	150.210	12,181.81	-8,916.31	5,221.70	14,456,225.400	1,750,476.915	39.805706184	-80.608108198
22,963.00	89.19	150.390	12,183.61	-8,998.21	5,267.27	14,456,145.502	1,750,522.488	39.805486218	-80.607947176
23,056.00	89.54	150.120	12,184.64	-9,076.95	5,313.41	14,456,064.760	1,750,568.626	39.805263930	-80.607784156
23,149.00	89.05	150.910	12,185.79	-9,157.89	5,359.18	14,455,983.813	1,750,614.397	39.805041078	-80.607622450



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-20 HU (slot T)
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-20 HU (slot T)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Feb2822

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
23,243.00	88.18	151.440	12,188.06	-9,240.22	5,404.49	14,455,901.485	1,750,659.704	39.804814442	-80.607462417
23,335.00	88.35	151.260	12,190.84	-9,320.92	5,448.58	14,455,820.786	1,750,703.793	39.804592294	-80.607306692
23,428.00	88.62	150.830	12,193.30	-9,402.27	5,493.58	14,455,739.440	1,750,748.801	39.804368357	-80.607147712
23,521.00	88.79	150.560	12,195.41	-9,483.35	5,539.09	14,455,658.362	1,750,794.309	39.804145152	-80.606986946
23,615.00	88.92	150.120	12,197.28	-9,565.01	5,585.60	14,455,576.695	1,750,840.815	39.803920315	-80.606822635
23,709.00	89.23	149.770	12,198.80	-9,646.36	5,632.67	14,455,495.345	1,750,887.887	39.803696341	-80.606656307
23,802.00	89.63	149.860	12,199.73	-9,726.75	5,679.43	14,455,414.960	1,750,934.644	39.803475020	-80.606491085
23,895.00	88.62	149.590	12,201.15	-9,807.05	5,726.31	14,455,334.654	1,750,981.524	39.803253917	-80.606325427
23,988.00	89.10	149.860	12,203.00	-9,887.35	5,773.18	14,455,254.354	1,751,028.401	39.803032829	-80.606159782
24,081.00	88.48	149.420	12,204.96	-9,967.58	5,820.18	14,455,174.126	1,751,075.395	39.802811937	-80.605993717
24,174.00	87.52	150.030	12,208.21	-10,047.85	5,867.04	14,455,093.860	1,751,122.251	39.802590943	-80.605828143
24,268.00	88.13	149.860	12,211.77	-10,129.15	5,914.08	14,455,012.558	1,751,169.295	39.802367101	-80.605661921
24,359.00	88.70	149.330	12,214.29	-10,207.60	5,960.12	14,454,934.104	1,751,215.333	39.802151092	-80.605499236
Survey @ 24359.00 MD 12214.29 TVD									
24,416.00	88.70	149.330	12,215.58	-10,256.62	5,989.19	14,454,885.090	1,751,244.401	39.802016136	-80.605396512
Survey Proj. to 24416.00 MD 12215.58 TVD									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
15,506.00	12,004.65	-2,530.64	1,568.02	Tie into sidetrack 01 @ 15506 MD	
24,359.00	12,214.29	-10,207.60	5,960.12	Survey @ 24359.00 MD 12214.29 TVD	
24,416.00	12,215.58	-10,256.62	5,989.19	Survey Proj. to 24416.00 MD 12215.58 TVD	

Checked By: _____ Approved By: _____ Date: _____

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