



Well: Breckenridge S-19 HU (slot R)
 Site: Breckenridge (1 row)
 Project: Marshall County, West Virginia NAD83 UTM 17N
 Design: rev8
 Rig: Nabors X14

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	5699.50	1.06	166.480	5696.95	60.41	-60.72	0.00	0.00	-80.04	Survey Begin 1°/100' drop
2	5805.50	0.00	166.480	5802.94	59.46	-60.49	1.00	180.00	-79.08	Begin vertical hold
3	7035.06	0.00	166.480	7032.50	59.46	-60.49	0.00	166.48	-79.08	Begin 2°/100' build
4	8018.04	19.66	279.201	7996.31	86.16	-225.33	2.00	279.20	-171.23	Begin 19.66° tangent
5	11109.22	19.66	279.201	10907.30	252.46	-1251.93	0.00	0.00	-745.14	Begin 5°/100' build/turn
6	12120.09	50.00	162.648	11792.40	-125.93	-1309.82	6.00	-128.17	-424.08	Begin 8°/100' build/turn
7	12629.39	89.00	149.679	11968.00	-549.92	-1114.82	8.00	-20.11	42.60	Begin 89.00° lateral
8	23829.40	89.00	149.679	12164.00	-10216.44	4538.53	0.00	0.00	1178.97	PBHL/TD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Breckenridge S-19HU LP r8	11968.00	-106.18	-1293.49	4465040.890	1743938.355	39.829991780	-80.631260240
- plan misses target center by 150.59ft at 12202.94ft MD (11842.09 TVD, -188.64 N, -1288.50 E)							
Breckenridge S-19HU BHL r8	12164.00	-10216.44	4538.53	4454930.656	1749770.369	39.802159000	-80.610644000
- plan hits target center							

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Annotation
184.50	0.41	228.760	184.50	-0.44	-0.50	0.19	MWD surveys
23747.00	88.82	148.930	12125.33	-10193.21	4525.32	11152.37	Survey @ 23747.00 MD 12125.33 TVD
23773.00	88.82	148.930	12125.87	-10215.48	4538.74	11178.19	Survey Proj. to 23773.00 MD 12125.87 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)

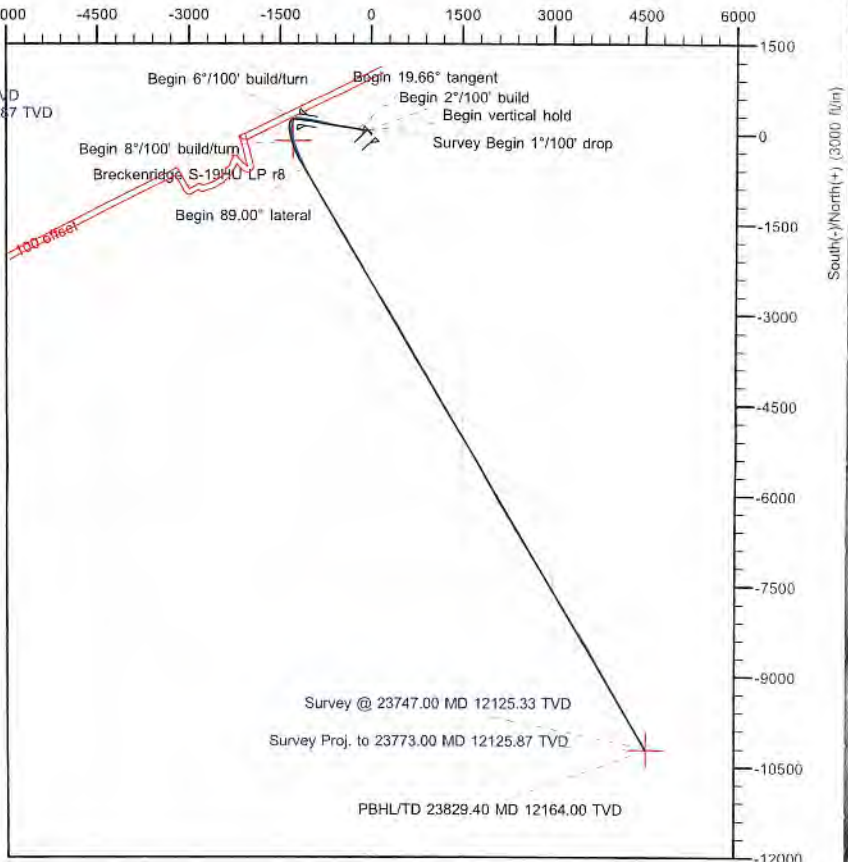
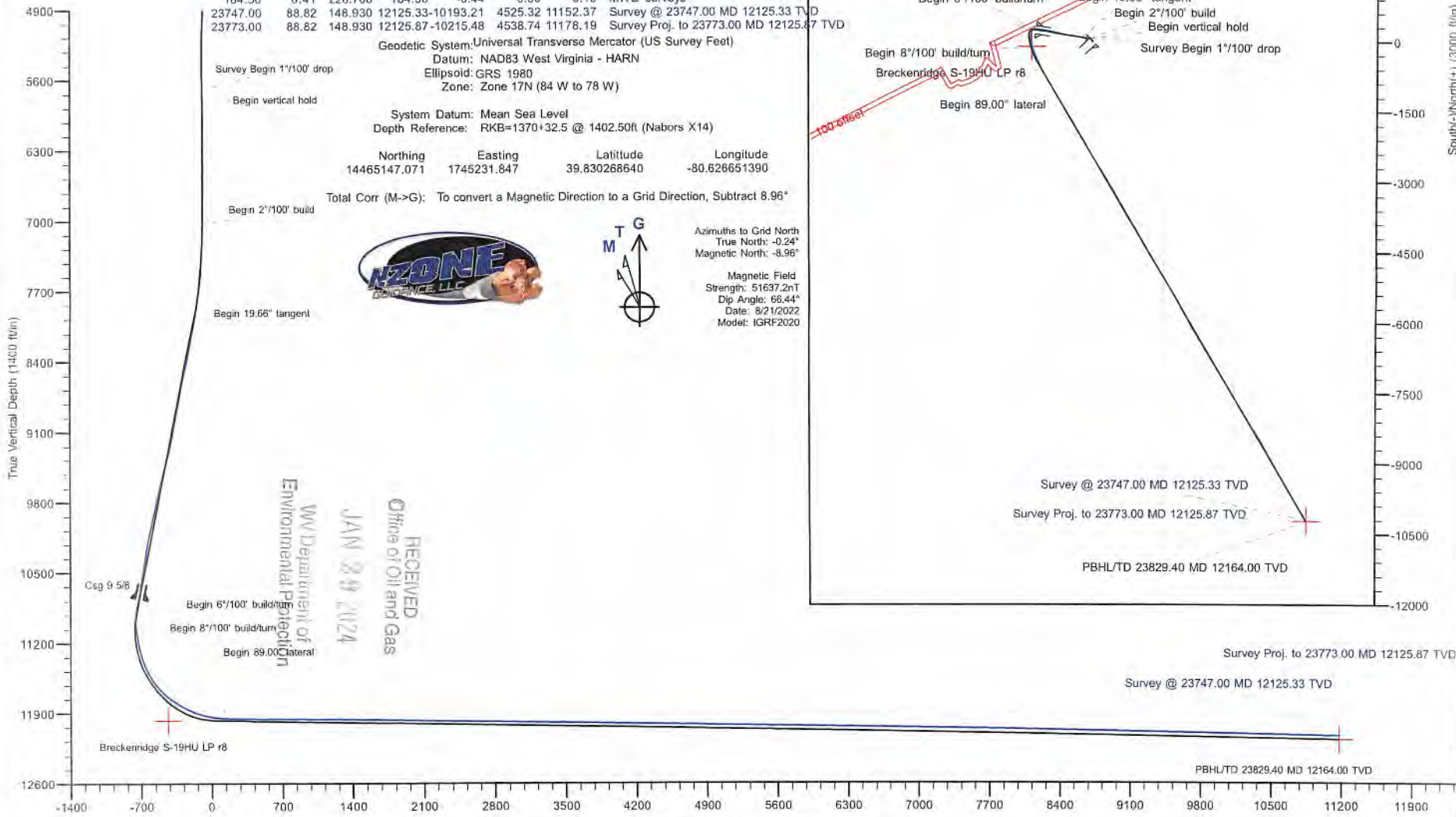
Northing	Easting	Latitude	Longitude
14465147.071	1745231.847	39.830268640	-80.626651390

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: 51637.2nT
 Dip Angle: 66.44°
 Date: 8/21/2022
 Model: IGRF2020



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Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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-19 HU (slot R)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,147.071 usft	Latitude:	39.830268640
	+E/-W	0.00 ft	Easting:	1,745,231.847 usft	Longitude:	-80.626651390
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	8/21/2022	-8.72	66.44	51,637.18486888

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	155.707	

Survey Program	Date 9/21/2022				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
184.50	1,179.50	MWD surf (Original Hole)	MWD	MWD - Standard	
1,219.50	3,006.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,053.50	5,699.50	MWD 3053.5-5699.5 MD (Original Hole)	MWD	MWD - Standard	
5,714.00	10,911.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
11,002.00	23,747.00	MWD (Original Hole)	MWD	MWD - Standard	
23,773.00	23,773.00	Projection (Original Hole)	MWD	MWD - Standard	

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Survey	WV Department of Environmental Protection										
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		
184.50	0.41	228.760	184.50	-0.44	-0.50	0.19	0.22	0.22	0.00		
MWD surveys											
215.50	0.36	253.180	215.50	-0.54	-0.67	0.21	0.55	-0.16	78.77		
245.50	0.34	243.640	245.50	-0.60	-0.84	0.20	0.21	-0.07	-31.80		
274.50	0.40	257.790	274.50	-0.66	-1.02	0.18	0.38	0.21	48.79		



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)
303.50	0.23	253.630	303.50	-0.70	-1.17	0.16	0.59	-0.59	-14.34
331.50	0.45	248.740	331.50	-0.76	-1.33	0.14	0.79	0.79	-17.46
363.50	0.37	246.740	363.49	-0.84	-1.54	0.13	0.25	-0.25	-6.25
394.50	0.21	259.380	394.49	-0.89	-1.69	0.12	0.55	-0.52	40.77
426.50	0.28	260.560	426.49	-0.92	-1.82	0.08	0.22	0.22	3.69
458.50	0.28	283.450	458.49	-0.91	-1.98	0.02	0.35	0.00	71.53
490.50	0.24	286.300	490.49	-0.87	-2.12	-0.07	0.13	-0.13	8.91
521.50	0.26	309.870	521.49	-0.81	-2.23	-0.18	0.34	0.06	76.03
553.50	0.21	261.610	553.49	-0.77	-2.35	-0.26	0.62	-0.16	-150.81
584.50	0.32	290.350	584.49	-0.75	-2.49	-0.34	0.55	0.35	92.71
616.50	0.45	300.190	616.49	-0.66	-2.68	-0.50	0.45	0.41	30.75
647.50	0.42	298.090	647.49	-0.54	-2.88	-0.69	0.11	-0.10	-6.77
679.50	0.59	298.130	679.49	-0.41	-3.13	-0.92	0.53	0.53	0.13
711.50	0.49	295.760	711.49	-0.27	-3.40	-1.15	0.32	-0.31	-7.41
742.50	0.70	323.810	742.49	-0.06	-3.63	-1.44	1.14	0.68	90.48
774.50	0.55	316.730	774.48	0.21	-3.85	-1.77	0.53	-0.47	-22.13
806.50	0.64	319.280	806.48	0.46	-4.07	-2.09	0.29	0.28	7.97
838.50	0.67	311.260	838.48	0.71	-4.33	-2.43	0.30	0.09	-25.06
870.50	0.68	308.370	870.48	0.96	-4.62	-2.77	0.11	0.03	-9.03
902.50	0.65	304.040	902.48	1.17	-4.92	-3.10	0.18	-0.09	-13.53
933.50	0.77	322.990	933.47	1.44	-5.19	-3.45	0.85	0.39	61.13
965.50	0.80	318.570	965.47	1.78	-5.47	-3.87	0.21	0.09	-13.81
997.50	0.93	325.100	997.47	2.16	-5.77	-4.34	0.51	0.41	20.41
1,029.50	0.86	312.870	1,029.46	2.54	-6.09	-4.82	0.63	-0.22	-38.22
1,061.50	0.97	311.510	1,061.46	2.88	-6.47	-5.29	0.35	0.34	-4.25
1,092.50	0.85	326.040	1,092.46	3.24	-6.79	-5.75	0.84	-0.39	46.87
1,124.50	0.96	320.240	1,124.45	3.65	-7.10	-6.24	0.45	0.34	-18.13
1,155.50	0.88	323.470	1,155.45	4.04	-7.41	-6.73	0.31	-0.26	10.42
1,179.50	0.96	321.990	1,179.44	4.34	-7.64	-7.10	0.35	0.33	-6.17
1,219.50	0.45	304.480	1,219.44	4.70	-7.97	-7.56	1.37	0.28	-43.78
1,251.50	0.52	348.970	1,251.44	4.91	-8.11	-7.81	1.17	0.22	139.03
1,282.50	0.52	351.570	1,282.44	5.19	-8.15	-8.08	0.08	0.00	8.39
1,314.50	0.40	332.900	1,314.44	5.43	-8.23	-8.33	0.60	-0.38	-58.34
1,346.50	0.49	41.820	1,346.44	5.63	-8.19	-8.50	1.59	0.28	215.38
1,378.50	0.48	19.270	1,378.44	5.86	-8.05	-8.65	0.59	0.03	70.47
1,410.50	0.67	49.750	1,410.43	6.11	-7.86	-8.80	1.10	0.59	95.25
1,441.50	0.58	47.170	1,441.43	6.33	-7.61	-8.90	0.30	-0.29	-8.32
1,473.50	0.62	35.720	1,473.43	6.58	-7.39	-9.04	0.39	0.13	-35.78
1,505.50	0.54	37.010	1,505.43	6.84	-7.20	-9.20	0.25	-0.25	4.03
1,537.50	0.89	41.480	1,537.43	7.15	-6.94	-9.37	1.11	1.09	13.97
1,569.50	0.82	56.180	1,569.42	7.46	-6.59	-9.51	0.72	-0.22	45.94
1,600.50	0.64	44.200	1,600.42	7.71	-6.28	-9.61	0.76	-0.58	-38.65
1,632.50	0.66	66.440	1,632.42	7.91	-5.99	-9.68	0.79	0.06	69.50

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Well:	Breckenridge S-19 HU (slot R)	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)
1,664.50	0.62	89.790	1,664.42	7.99	-5.65	-9.60	0.82	-0.13	72.97
1,695.50	1.05	106.080	1,695.41	7.91	-5.21	-9.35	1.57	1.39	52.55
1,727.50	1.50	127.150	1,727.41	7.58	-4.59	-8.79	2.01	1.41	65.84
1,759.50	1.88	136.460	1,759.39	6.94	-3.90	-7.93	1.46	1.19	29.09
1,790.50	2.10	121.290	1,790.37	6.28	-3.06	-6.98	1.83	0.71	-48.94
1,822.50	2.11	126.530	1,822.35	5.62	-2.09	-5.98	0.60	0.03	16.38
1,854.50	2.17	141.110	1,854.33	4.80	-1.23	-4.88	1.71	0.19	45.56
1,885.50	2.22	140.510	1,885.31	3.88	-0.48	-3.74	0.18	0.16	-1.94
1,917.50	1.97	149.400	1,917.29	2.93	0.19	-2.59	1.28	-0.78	27.78
1,948.50	1.16	165.170	1,948.27	2.17	0.54	-1.75	2.94	-2.61	50.87
1,980.50	0.68	181.700	1,980.27	1.66	0.62	-1.26	1.70	-1.50	51.66
2,012.50	0.60	213.710	2,012.27	1.33	0.52	-1.00	1.13	-0.25	100.03
2,043.50	0.77	253.490	2,043.27	1.14	0.23	-0.94	1.59	0.55	128.32
2,075.50	1.28	268.050	2,075.26	1.07	-0.33	-1.11	1.78	1.59	45.50
2,107.50	1.15	263.070	2,107.25	1.02	-1.01	-1.34	0.52	-0.41	-15.56
2,138.50	1.18	279.170	2,138.25	1.03	-1.63	-1.61	1.06	0.10	51.94
2,170.50	0.96	321.780	2,170.24	1.29	-2.12	-2.05	2.51	-0.69	133.16
2,201.50	1.44	351.210	2,201.24	1.88	-2.34	-2.68	2.47	1.55	94.94
2,233.50	1.93	4.740	2,233.22	2.82	-2.36	-3.54	1.96	1.53	42.28
2,264.50	2.03	3.960	2,264.20	3.88	-2.28	-4.48	0.33	0.32	-2.52
2,296.50	1.63	14.890	2,296.19	4.89	-2.12	-5.33	1.65	-1.25	34.16
2,328.50	1.50	21.920	2,328.17	5.72	-1.85	-5.97	0.72	-0.41	21.97
2,359.50	1.38	30.230	2,359.17	6.42	-1.51	-6.47	0.78	-0.39	26.81
2,391.50	0.85	29.510	2,391.16	6.96	-1.20	-6.83	1.66	-1.66	-2.25
2,422.50	0.46	183.880	2,422.16	7.03	-1.09	-6.86	4.13	-1.26	497.97
2,454.50	0.77	205.440	2,454.16	6.71	-1.19	-6.61	1.19	0.97	67.38
2,485.50	1.07	211.410	2,485.15	6.27	-1.43	-6.31	1.01	0.97	19.26
2,548.50	1.34	206.640	2,548.14	5.11	-2.07	-5.51	0.46	0.43	-7.57
2,580.50	1.05	216.590	2,580.13	4.54	-2.41	-5.13	1.11	-0.91	31.09
2,612.50	0.85	245.120	2,612.13	4.21	-2.80	-4.99	1.58	-0.63	89.16
2,644.50	0.91	271.700	2,644.12	4.12	-3.27	-5.10	1.28	0.19	83.06
2,675.50	0.73	298.730	2,675.12	4.22	-3.69	-5.36	1.36	-0.58	87.19
2,738.50	1.37	25.700	2,738.11	5.09	-3.72	-6.17	2.41	1.02	138.05
2,769.50	1.35	28.520	2,769.10	5.75	-3.38	-6.63	0.23	-0.06	9.10
2,801.50	1.30	41.680	2,801.10	6.35	-2.96	-7.00	0.96	-0.16	41.13
2,833.50	1.29	62.830	2,833.09	6.78	-2.40	-7.17	1.49	-0.03	66.09
2,865.50	1.17	55.940	2,865.08	7.13	-1.81	-7.24	0.59	-0.38	-21.53
2,896.50	0.93	70.130	2,896.07	7.39	-1.31	-7.28	1.14	-0.77	45.77
2,928.50	0.81	69.460	2,928.07	7.56	-0.85	-7.24	0.38	-0.38	-2.09
2,959.50	0.61	99.770	2,959.07	7.61	-0.49	-7.14	1.35	-0.65	97.77
2,991.50	0.46	77.030	2,991.07	7.61	-0.19	-7.02	0.80	-0.47	-71.06
3,006.50	0.33	91.460	3,006.07	7.62	-0.09	-6.98	1.08	-0.87	96.20
3,053.50	0.31	17.260	3,053.07	7.74	0.08	-7.02	0.82	-0.04	-157.87



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Well:	Breckenridge S-19 HU (slot R)	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)
3,085.50	0.46	14.570	3,085.07	7.95	0.14	-7.19	0.47	0.47	-8.41
3,117.50	0.58	5.040	3,117.06	8.23	0.19	-7.43	0.46	0.38	-29.78
3,149.50	0.70	353.930	3,149.06	8.59	0.18	-7.75	0.54	0.38	-34.72
3,181.50	0.75	349.690	3,181.06	8.99	0.12	-8.14	0.23	0.16	-13.25
3,212.50	0.73	341.010	3,212.06	9.38	0.02	-8.54	0.37	-0.06	-28.00
3,244.50	0.71	328.530	3,244.05	9.74	-0.15	-8.94	0.49	-0.06	-39.00
3,276.50	0.70	333.710	3,276.05	10.08	-0.34	-9.33	0.20	-0.03	16.19
3,308.50	0.78	331.660	3,308.05	10.45	-0.53	-9.74	0.26	0.25	-6.41
3,339.50	0.68	324.580	3,339.05	10.78	-0.73	-10.13	0.43	-0.32	-22.84
3,370.50	0.60	308.780	3,370.05	11.04	-0.97	-10.46	0.62	-0.26	-50.97
3,402.50	0.55	303.540	3,402.04	11.23	-1.23	-10.74	0.23	-0.16	-16.38
3,434.50	0.45	278.060	3,434.04	11.33	-1.48	-10.93	0.75	-0.31	-79.63
3,465.50	0.44	250.720	3,465.04	11.31	-1.71	-11.01	0.68	-0.03	-88.19
3,496.50	0.52	245.950	3,496.04	11.21	-1.95	-11.02	0.29	0.26	-15.39
3,527.50	0.73	255.620	3,527.04	11.10	-2.27	-11.05	0.76	0.68	31.19
3,559.50	1.07	273.520	3,559.03	11.07	-2.77	-11.23	1.37	1.06	55.94
3,591.50	1.61	279.240	3,591.03	11.16	-3.51	-11.62	1.74	1.69	17.88
3,622.50	2.24	286.120	3,622.01	11.40	-4.52	-12.25	2.16	2.03	22.19
3,652.50	2.68	290.060	3,651.98	11.80	-5.74	-13.12	1.57	1.47	13.13
3,684.50	2.87	293.110	3,683.94	12.37	-7.18	-14.23	0.75	0.59	9.53
3,715.50	2.97	294.900	3,714.90	13.02	-8.63	-15.41	0.44	0.32	5.77
3,747.50	2.97	295.050	3,746.86	13.72	-10.13	-16.67	0.02	0.00	0.47
3,778.50	2.97	297.260	3,777.82	14.42	-11.57	-17.91	0.37	0.00	7.13
3,810.50	2.95	296.040	3,809.78	15.17	-13.05	-19.19	0.21	-0.06	-3.81
3,842.50	2.92	297.710	3,841.73	15.91	-14.51	-20.47	0.28	-0.09	5.22
3,872.50	2.97	297.070	3,871.69	16.61	-15.88	-21.68	0.20	0.17	-2.13
3,903.50	3.02	296.900	3,902.65	17.35	-17.32	-22.94	0.16	0.16	-0.55
3,935.50	3.10	298.880	3,934.61	18.15	-18.83	-24.29	0.41	0.25	6.19
3,967.50	3.03	301.130	3,966.56	19.00	-20.31	-25.68	0.43	-0.22	7.03
3,998.50	2.82	305.700	3,997.52	19.87	-21.63	-27.01	1.01	-0.68	14.74
4,029.50	2.84	309.080	4,028.48	20.80	-22.85	-28.36	0.54	0.06	10.90
4,061.50	2.83	314.000	4,060.44	21.85	-24.03	-29.80	0.76	-0.03	15.38
4,093.50	2.79	314.430	4,092.40	22.94	-25.16	-31.26	0.14	-0.13	1.34
4,125.50	2.85	315.500	4,124.37	24.06	-26.27	-32.73	0.25	0.19	3.34
4,157.50	2.91	318.340	4,156.33	25.23	-27.37	-34.26	0.48	0.19	8.88
4,188.50	2.96	321.290	4,187.28	26.44	-28.39	-35.78	0.51	0.16	9.52
4,219.50	3.13	322.230	4,218.24	27.74	-29.41	-37.38	0.57	0.55	3.03
4,251.50	3.20	321.950	4,250.19	29.13	-30.50	-39.10	0.22	0.22	-0.88
4,282.50	3.16	323.210	4,281.14	30.50	-31.54	-40.77	0.26	-0.13	4.06
4,314.50	3.28	325.030	4,313.09	31.95	-32.59	-42.53	0.49	0.38	5.69
4,345.50	3.19	324.180	4,344.04	33.38	-33.61	-44.25	0.33	-0.29	-2.74
4,377.50	2.87	322.240	4,376.00	34.73	-34.62	-45.90	1.05	-1.00	-6.06
4,408.50	2.70	318.780	4,406.96	35.90	-35.57	-47.35	0.77	-0.55	-11.16
4,439.50	2.57	318.300	4,437.93	36.97	-36.52	-48.72	0.43	-0.42	-1.55



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)
4,471.50	2.67	319.690	4,469.90	38.07	-37.48	-50.12	0.37	0.31	4.34
4,502.50	2.75	321.800	4,500.86	39.20	-38.40	-51.53	0.41	0.26	6.81
4,534.50	2.85	324.840	4,532.82	40.46	-39.34	-53.06	0.56	0.31	9.50
4,564.50	3.08	326.980	4,562.78	41.74	-40.21	-54.59	0.85	0.77	7.13
4,595.50	3.26	327.320	4,593.74	43.18	-41.14	-56.28	0.58	0.58	1.10
4,627.50	3.26	324.890	4,625.68	44.69	-42.15	-58.08	0.43	0.00	-7.59
4,658.50	3.03	317.620	4,656.64	46.02	-43.21	-59.72	1.48	-0.74	-23.45
4,690.50	3.08	314.320	4,688.59	47.25	-44.39	-61.33	0.57	0.16	-10.31
4,721.50	3.25	312.330	4,719.55	48.42	-45.64	-62.91	0.65	0.55	-6.42
4,753.50	3.43	312.080	4,751.49	49.67	-47.02	-64.62	0.56	0.56	-0.78
4,783.50	3.43	312.280	4,781.44	50.88	-48.35	-66.26	0.04	0.00	0.67
4,815.50	2.86	314.410	4,813.39	52.08	-49.63	-67.89	1.82	-1.78	6.66
4,845.50	2.76	315.980	4,843.35	53.12	-50.67	-69.26	0.42	-0.33	5.23
4,876.50	2.81	317.520	4,874.32	54.22	-51.70	-70.69	0.29	0.16	4.97
4,908.50	3.02	319.610	4,906.27	55.44	-52.77	-72.24	0.74	0.66	6.53
4,940.50	3.26	319.670	4,938.23	56.78	-53.91	-73.93	0.75	0.75	0.19
4,972.50	3.34	319.150	4,970.17	58.18	-55.11	-75.69	0.27	0.25	-1.63
5,003.50	2.93	319.070	5,001.13	59.46	-56.22	-77.32	1.32	-1.32	-0.26
5,035.50	2.58	318.050	5,033.09	60.61	-57.23	-78.79	1.10	-1.09	-3.19
5,066.50	2.16	318.510	5,064.06	61.57	-58.09	-80.01	1.36	-1.35	1.48
5,098.50	2.09	317.410	5,096.04	62.45	-58.88	-81.14	0.25	-0.22	-3.44
5,130.50	1.92	315.760	5,128.02	63.26	-59.65	-82.20	0.56	-0.53	-5.16
5,162.50	1.40	313.500	5,160.01	63.91	-60.31	-83.07	1.64	-1.63	-7.06
5,194.50	1.05	312.380	5,192.00	64.38	-60.81	-83.70	1.10	-1.09	-3.50
5,225.50	0.95	310.440	5,223.00	64.74	-61.21	-84.19	0.34	-0.32	-6.26
5,257.50	0.68	307.170	5,254.99	65.03	-61.57	-84.60	0.86	-0.84	-10.22
5,289.50	0.38	269.210	5,286.99	65.14	-61.82	-84.81	1.40	-0.94	-118.63
5,320.50	0.23	242.140	5,317.99	65.11	-61.98	-84.84	0.66	-0.48	-87.32
5,352.50	0.28	210.040	5,349.99	65.01	-62.08	-84.79	0.47	0.16	-100.31
5,383.50	0.36	186.490	5,380.99	64.85	-62.13	-84.67	0.49	0.26	-75.97
5,415.50	0.36	182.460	5,412.99	64.65	-62.14	-84.49	0.08	0.00	-12.59
5,447.50	0.49	171.200	5,444.99	64.41	-62.13	-84.27	0.48	0.41	-35.19
5,479.50	0.69	169.870	5,476.99	64.09	-62.07	-83.95	0.63	0.63	-4.16
5,510.50	0.77	161.690	5,507.98	63.71	-61.97	-83.56	0.42	0.26	-26.39
5,541.50	0.85	161.750	5,538.98	63.29	-61.84	-83.13	0.26	0.26	0.19
5,573.50	1.05	154.890	5,570.98	62.80	-61.64	-82.60	0.72	0.63	-21.44
5,604.50	1.22	158.420	5,601.97	62.24	-61.40	-81.98	0.59	0.55	11.39
5,636.50	1.28	158.400	5,633.96	61.59	-61.14	-81.29	0.19	0.19	-0.06
5,667.50	1.11	158.430	5,664.96	60.99	-60.90	-80.64	0.55	-0.55	0.10
5,699.50	1.06	166.480	5,696.95	60.41	-60.72	-80.04	0.50	-0.16	25.16
5,714.00	0.91	170.340	5,711.45	60.17	-60.67	-79.80	1.13	-1.03	26.62
5,808.00	0.77	189.810	5,805.44	58.81	-60.65	-78.55	0.34	-0.15	20.71
5,901.00	0.91	198.390	5,898.43	57.49	-60.99	-77.49	0.20	0.15	9.23



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)
5,995.00	1.15	199.170	5,992.41	55.89	-61.53	-76.26	0.26	0.26	0.83
6,089.00	0.43	196.880	6,086.40	54.66	-61.95	-75.31	0.77	-0.77	-2.44
6,183.00	0.26	97.430	6,180.40	54.30	-61.84	-74.93	0.57	-0.18	-105.80
6,277.00	0.22	109.270	6,274.40	54.21	-61.46	-74.69	0.07	-0.04	12.60
6,370.00	0.34	109.920	6,367.40	54.06	-61.03	-74.38	0.13	0.13	0.70
6,463.00	0.34	117.800	6,460.40	53.84	-60.52	-73.97	0.05	0.00	8.47
6,557.00	0.43	118.640	6,554.40	53.54	-59.97	-73.47	0.10	0.10	0.89
6,649.00	0.46	328.000	6,646.40	53.68	-59.86	-73.56	0.94	0.03	-163.74
6,743.00	0.94	313.760	6,740.39	54.54	-60.62	-74.65	0.54	0.51	-15.15
6,836.00	1.07	317.400	6,833.37	55.70	-61.76	-76.18	0.16	0.14	3.91
6,899.00	0.91	315.950	6,896.37	56.50	-62.50	-77.21	0.26	-0.25	-2.30
6,991.00	0.67	310.260	6,988.36	57.37	-63.42	-78.38	0.27	-0.26	-6.18
7,061.00	1.15	279.790	7,058.35	57.75	-64.42	-79.14	0.95	0.69	-43.53
7,116.00	1.82	287.850	7,113.33	58.11	-65.80	-80.04	1.27	1.22	14.65
7,208.00	3.33	282.570	7,205.23	59.14	-69.80	-82.62	1.66	1.64	-5.74
7,348.00	6.53	283.180	7,344.70	61.84	-81.52	-89.91	2.29	2.29	0.44
7,395.00	7.08	282.200	7,391.37	63.07	-86.95	-93.25	1.20	1.17	-2.09
7,488.00	9.08	281.060	7,483.44	65.69	-99.76	-100.91	2.16	2.15	-1.23
7,595.00	11.00	279.240	7,588.80	68.94	-118.12	-111.44	1.82	1.79	-1.70
7,675.00	11.70	278.780	7,667.23	71.41	-133.67	-120.08	0.88	0.88	-0.58
7,768.00	12.72	278.590	7,758.13	74.38	-153.12	-130.78	1.10	1.10	-0.20
7,861.00	13.66	279.720	7,848.67	77.76	-174.07	-142.48	1.05	1.01	1.22
8,092.00	17.52	279.420	8,071.13	88.06	-235.27	-177.05	1.67	1.67	-0.13
8,140.00	17.62	278.750	8,116.89	90.35	-249.58	-185.03	0.47	0.21	-1.40
8,234.00	19.50	278.030	8,206.00	94.70	-279.18	-201.17	2.01	2.00	-0.77
8,327.00	19.77	277.200	8,293.59	98.84	-310.16	-217.69	0.42	0.29	-0.89
8,421.00	19.75	279.150	8,382.06	103.36	-341.61	-234.75	0.70	-0.02	2.07
8,514.00	20.98	279.700	8,469.24	108.67	-373.53	-252.71	1.34	1.32	0.59
8,607.00	21.33	278.410	8,555.98	113.94	-406.68	-271.16	0.63	0.38	-1.39
8,701.00	21.00	277.460	8,643.63	118.63	-440.29	-289.26	0.51	-0.35	-1.01
8,795.00	20.16	279.980	8,731.64	123.63	-472.94	-307.25	1.30	-0.89	2.68
8,889.00	19.24	280.890	8,820.13	129.36	-504.11	-325.29	1.03	-0.98	0.97
8,982.00	15.89	279.540	8,908.79	134.37	-531.72	-341.22	3.63	-3.60	-1.45
9,076.00	16.30	282.660	8,999.10	139.39	-557.28	-356.31	1.02	0.44	3.32
9,263.00	19.22	284.560	9,177.17	152.88	-612.69	-391.40	1.59	1.56	1.02
9,355.00	20.69	284.760	9,263.65	160.83	-643.06	-411.14	1.60	1.60	0.22
9,448.00	21.42	285.730	9,350.44	169.62	-675.29	-432.42	0.87	0.78	1.04
9,541.00	21.91	285.490	9,436.87	178.86	-708.36	-454.44	0.54	0.53	-0.26
9,645.00	22.40	282.050	9,533.19	188.18	-746.44	-478.60	1.33	0.47	-3.31
9,788.00	22.93	281.420	9,665.15	199.38	-800.39	-511.01	0.41	0.37	-0.44
9,820.00	23.01	280.950	9,694.61	201.80	-812.64	-518.26	0.63	0.25	-1.47
9,913.00	21.34	278.370	9,780.73	207.72	-847.23	-537.88	2.08	-1.80	-2.77
10,007.00	23.39	277.420	9,867.66	212.62	-882.66	-556.92	2.21	2.18	-1.01



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)
10,101.00	21.94	279.900	9,954.40	218.05	-918.47	-576.60	1.85	-1.54	2.64
10,194.00	20.31	281.590	10,041.15	224.28	-951.40	-595.82	1.87	-1.75	1.82
10,287.00	18.97	283.930	10,128.73	231.16	-981.88	-614.64	1.67	-1.44	2.52
10,380.00	16.95	282.120	10,217.20	237.65	-1,009.81	-632.04	2.25	-2.17	-1.95
10,473.00	16.79	278.140	10,306.20	242.40	-1,036.36	-647.29	1.25	-0.17	-4.28
10,567.00	17.46	274.640	10,396.03	245.46	-1,063.86	-661.39	1.31	0.71	-3.72
10,660.00	17.56	275.490	10,484.73	247.93	-1,091.73	-675.11	0.30	0.11	0.91
10,753.00	17.66	277.010	10,573.37	250.99	-1,119.69	-689.41	0.51	0.11	1.63
10,846.00	17.91	278.680	10,661.92	254.87	-1,147.83	-704.52	0.61	0.27	1.80
10,911.00	18.22	280.170	10,723.72	258.18	-1,167.71	-715.71	0.86	0.48	2.29
11,002.00	19.49	284.350	10,809.84	264.45	-1,196.43	-733.24	2.04	1.40	4.59
11,039.00	19.53	281.440	10,844.72	267.21	-1,208.47	-740.71	2.63	0.11	-7.86
11,094.00	18.69	271.710	10,896.70	269.29	-1,226.29	-749.94	5.98	-1.53	-17.69
11,141.00	17.32	255.620	10,941.42	267.78	-1,240.61	-754.45	10.94	-2.91	-34.23
11,187.00	17.01	243.680	10,985.39	263.09	-1,253.27	-755.39	7.68	-0.67	-25.96
11,234.00	17.23	234.380	11,030.31	255.99	-1,265.10	-753.78	5.84	0.47	-19.79
11,280.00	17.50	223.720	11,074.23	247.02	-1,275.42	-749.85	6.93	0.59	-23.17
11,327.00	17.45	212.830	11,119.07	235.99	-1,284.12	-743.38	6.95	-0.11	-23.17
11,374.00	17.50	203.930	11,163.91	223.61	-1,290.81	-734.85	5.68	0.11	-18.94
11,421.00	17.32	198.330	11,208.76	210.51	-1,295.88	-724.99	3.58	-0.38	-11.91
11,469.00	17.37	194.940	11,254.58	196.80	-1,299.97	-714.18	2.11	0.10	-7.06
11,516.00	18.29	193.790	11,299.32	182.86	-1,303.54	-702.94	2.10	1.96	-2.45
11,562.00	20.55	192.910	11,342.70	167.98	-1,307.06	-690.83	4.95	4.91	-1.91
11,609.00	23.51	192.210	11,386.26	150.77	-1,310.89	-676.72	6.32	6.30	-1.49
11,657.00	26.38	190.670	11,429.78	130.93	-1,314.89	-660.28	6.13	5.98	-3.21
11,698.00	28.90	187.230	11,466.10	112.15	-1,317.82	-644.37	7.27	6.15	-8.39
11,751.00	31.73	180.790	11,511.86	85.49	-1,319.63	-620.82	8.13	5.34	-12.15
11,798.00	34.47	175.990	11,551.24	59.86	-1,318.87	-597.14	8.06	5.83	-10.21
11,846.00	37.07	171.940	11,590.19	31.98	-1,315.89	-570.50	7.32	5.42	-8.44
11,893.00	39.95	169.560	11,626.96	3.10	-1,311.17	-542.24	6.89	6.13	-5.06
11,939.00	43.22	167.400	11,661.37	-26.80	-1,305.05	-512.47	7.76	7.11	-4.70
11,986.00	46.49	166.740	11,694.68	-59.11	-1,297.63	-479.97	7.03	6.96	-1.40
12,034.00	50.42	165.110	11,726.51	-93.94	-1,288.88	-444.62	8.57	8.19	-3.40
12,081.00	54.00	162.330	11,755.31	-129.57	-1,278.45	-407.85	8.94	7.62	-5.91
12,128.00	57.05	160.350	11,781.91	-166.27	-1,266.05	-369.30	7.36	6.49	-4.21
12,175.00	59.48	159.020	11,806.63	-203.75	-1,252.17	-329.43	5.70	5.17	-2.83
12,222.00	61.69	158.450	11,829.71	-241.90	-1,237.32	-288.55	4.82	4.70	-1.21
12,269.00	63.94	158.100	11,851.18	-280.74	-1,221.84	-246.78	4.83	4.79	-0.74
12,317.00	66.15	157.570	11,871.44	-321.04	-1,205.42	-203.30	4.71	4.60	-1.10
12,364.00	68.54	157.660	11,889.54	-361.14	-1,188.91	-159.95	5.09	5.09	0.19
12,411.00	71.01	156.650	11,905.78	-401.78	-1,171.78	-115.87	5.63	5.26	-2.15
12,458.00	74.50	156.290	11,919.72	-442.93	-1,153.86	-70.99	7.46	7.43	-0.77
12,505.00	78.26	155.060	11,930.78	-484.54	-1,135.05	-25.32	8.39	8.00	-2.62
12,552.00	81.62	153.520	11,938.99	-526.23	-1,114.97	20.93	7.84	7.15	-3.28



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)
12,599.00	84.89	152.190	11,944.51	-567.75	-1,093.68	67.54	7.50	6.96	-2.83
12,646.00	88.25	151.180	11,947.32	-609.05	-1,071.43	114.34	7.46	7.15	-2.15
12,693.00	88.47	152.020	11,948.67	-650.37	-1,049.08	161.20	1.85	0.47	1.79
12,787.00	88.56	151.450	11,951.10	-733.14	-1,004.59	254.94	0.61	0.10	-0.61
12,881.00	88.82	150.340	11,953.25	-815.25	-958.88	348.58	1.21	0.28	-1.18
12,975.00	89.26	147.920	11,954.83	-895.91	-910.66	441.94	2.62	0.47	-2.57
13,069.00	90.06	150.040	11,955.39	-976.46	-862.22	535.29	2.41	0.85	2.26
13,163.00	89.97	150.080	11,955.36	-1,057.92	-815.30	628.83	0.10	-0.10	0.04
13,257.00	89.93	150.480	11,955.44	-1,139.55	-768.70	722.41	0.43	-0.04	0.43
13,351.00	89.88	150.560	11,955.60	-1,221.38	-722.44	816.02	0.10	-0.05	0.09
13,445.00	89.97	149.990	11,955.72	-1,303.01	-675.83	909.60	0.61	0.10	-0.61
13,539.00	89.35	150.480	11,956.28	-1,384.61	-629.17	1,003.17	0.84	-0.66	0.52
13,634.00	89.35	150.040	11,957.36	-1,467.09	-582.05	1,097.74	0.46	0.00	-0.46
13,730.00	89.44	150.610	11,958.37	-1,550.49	-534.52	1,193.31	0.60	0.09	0.59
13,823.00	89.26	150.390	11,959.43	-1,631.43	-488.73	1,285.92	0.31	-0.19	-0.24
13,916.00	89.09	150.300	11,960.77	-1,712.24	-442.72	1,378.50	0.21	-0.18	-0.10
14,008.00	89.17	150.390	11,962.16	-1,792.18	-397.21	1,470.09	0.13	0.09	0.10
14,101.00	89.13	149.510	11,963.54	-1,872.67	-350.64	1,562.61	0.95	-0.04	-0.95
14,194.00	89.09	148.490	11,964.99	-1,952.38	-302.75	1,654.96	1.10	-0.04	-1.10
14,288.00	89.00	148.890	11,966.55	-2,032.68	-253.91	1,748.24	0.44	-0.10	0.43
14,381.00	89.09	148.580	11,968.10	-2,112.16	-205.65	1,840.54	0.35	0.10	-0.33
14,474.00	89.09	148.180	11,969.58	-2,191.35	-156.89	1,932.77	0.43	0.00	-0.43
14,568.00	89.13	148.540	11,971.04	-2,271.36	-107.59	2,025.98	0.39	0.04	0.38
14,661.00	89.17	148.760	11,972.42	-2,350.78	-59.21	2,118.27	0.24	0.04	0.24
14,754.00	89.13	149.240	11,973.80	-2,430.48	-11.32	2,210.62	0.52	-0.04	0.52
14,847.00	89.09	148.670	11,975.24	-2,510.15	36.64	2,302.97	0.61	-0.04	-0.61
14,939.00	89.13	148.670	11,976.67	-2,588.73	84.47	2,394.26	0.04	0.04	0.00
15,032.00	89.09	148.580	11,978.12	-2,668.12	132.88	2,486.54	0.11	-0.04	-0.10
15,125.00	89.09	148.710	11,979.60	-2,747.53	181.27	2,578.82	0.14	0.00	0.14
15,219.00	89.13	149.290	11,981.06	-2,828.09	229.67	2,672.17	0.62	0.04	0.62
15,312.00	89.09	149.330	11,982.50	-2,908.06	277.14	2,764.58	0.06	-0.04	0.04
15,406.00	89.17	149.460	11,983.93	-2,988.95	324.99	2,858.00	0.16	0.09	0.14
15,499.00	89.04	149.510	11,985.38	-3,069.06	372.20	2,950.44	0.15	-0.14	0.05
15,593.00	89.13	149.590	11,986.88	-3,150.09	419.84	3,043.89	0.13	0.10	0.09
15,687.00	89.09	149.550	11,988.34	-3,231.13	467.44	3,137.34	0.06	-0.04	-0.04
15,780.00	89.09	150.080	11,989.82	-3,311.51	514.19	3,229.83	0.57	0.00	0.57
15,874.00	89.13	150.170	11,991.28	-3,393.01	561.01	3,323.37	0.10	0.04	0.10
15,967.00	89.26	149.290	11,992.58	-3,473.32	607.88	3,415.86	0.96	0.14	-0.95
16,060.00	89.13	149.680	11,993.89	-3,553.43	655.10	3,508.30	0.44	-0.14	0.42
16,152.00	89.04	150.430	11,995.36	-3,633.14	701.02	3,599.84	0.82	-0.10	0.82
16,246.00	89.00	150.390	11,996.97	-3,714.87	747.43	3,693.43	0.06	-0.04	-0.04
16,338.00	89.04	150.480	11,998.54	-3,794.88	792.81	3,785.02	0.11	0.04	0.10
16,431.00	89.13	149.860	12,000.03	-3,875.54	839.07	3,877.58	0.67	0.10	-0.67



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)
16,524.00	89.13	150.040	12,001.44	-3,956.03	885.63	3,970.10	0.19	0.00	0.19
16,617.00	89.09	150.080	12,002.88	-4,036.61	932.04	4,062.64	0.06	-0.04	0.04
16,711.00	89.04	150.430	12,004.42	-4,118.22	978.68	4,156.20	0.38	-0.05	0.37
16,804.00	89.17	149.730	12,005.87	-4,198.81	1,025.06	4,248.74	0.77	0.14	-0.75
16,897.00	89.13	149.550	12,007.25	-4,279.05	1,072.06	4,341.21	0.20	-0.04	-0.19
16,990.00	89.17	149.990	12,008.63	-4,359.39	1,118.87	4,433.70	0.48	0.04	0.47
17,083.00	89.17	149.950	12,009.98	-4,439.90	1,165.41	4,526.22	0.04	0.00	-0.04
17,177.00	89.09	149.990	12,011.40	-4,521.27	1,212.45	4,619.74	0.10	-0.09	0.04
17,269.00	89.13	149.810	12,012.83	-4,600.86	1,258.58	4,711.26	0.20	0.04	-0.20
17,362.00	89.09	149.990	12,014.28	-4,681.31	1,305.22	4,803.77	0.20	-0.04	0.19
17,456.00	89.09	149.860	12,015.77	-4,762.64	1,352.32	4,897.28	0.14	0.00	-0.14
17,550.00	89.17	149.420	12,017.20	-4,843.74	1,399.82	4,990.74	0.48	0.09	-0.47
17,642.00	89.04	150.260	12,018.63	-4,923.28	1,446.04	5,082.25	0.92	-0.14	0.91
17,736.00	89.13	149.370	12,020.14	-5,004.52	1,493.29	5,175.74	0.95	0.10	-0.95
17,829.00	89.09	149.900	12,021.58	-5,084.75	1,540.30	5,268.20	0.57	-0.04	0.57
17,922.00	89.04	149.810	12,023.10	-5,165.16	1,587.00	5,360.71	0.11	-0.05	-0.10
18,014.00	89.09	149.990	12,024.60	-5,244.75	1,633.13	5,452.22	0.20	0.05	0.20
18,108.00	89.17	149.370	12,026.03	-5,325.88	1,680.58	5,545.69	0.66	0.09	-0.66
18,200.00	89.31	149.860	12,027.25	-5,405.24	1,727.11	5,637.16	0.55	0.15	0.53
18,294.00	89.22	150.610	12,028.45	-5,486.83	1,773.77	5,730.73	0.80	-0.10	0.80
18,388.00	89.04	150.210	12,029.88	-5,568.56	1,820.18	5,824.31	0.47	-0.19	-0.43
18,481.00	88.95	150.650	12,031.51	-5,649.43	1,866.07	5,916.91	0.48	-0.10	0.47
18,575.00	89.00	150.520	12,033.19	-5,731.30	1,912.23	6,010.52	0.15	0.05	-0.14
18,668.00	89.09	149.900	12,034.74	-5,812.00	1,958.43	6,103.07	0.67	0.10	-0.67
18,762.00	89.26	149.640	12,036.10	-5,893.21	2,005.75	6,196.56	0.33	0.18	-0.28
18,855.00	89.13	150.040	12,037.40	-5,973.61	2,052.47	6,289.06	0.45	-0.14	0.43
18,949.00	89.13	150.210	12,038.83	-6,055.11	2,099.28	6,382.61	0.18	0.00	0.18
19,042.00	89.04	150.210	12,040.32	-6,135.81	2,145.48	6,475.17	0.10	-0.10	0.00
19,135.00	89.13	149.860	12,041.80	-6,216.37	2,191.93	6,567.70	0.39	0.10	-0.38
19,229.00	89.09	149.900	12,043.26	-6,297.67	2,239.09	6,661.20	0.06	-0.04	0.04
19,322.00	89.13	150.300	12,044.70	-6,378.28	2,285.45	6,753.75	0.43	0.04	0.43
19,415.00	89.13	150.170	12,046.12	-6,459.00	2,331.61	6,846.31	0.14	0.00	-0.14
19,509.00	89.09	149.550	12,047.58	-6,540.28	2,378.80	6,939.81	0.66	-0.04	-0.66
19,601.00	89.13	150.040	12,049.01	-6,619.78	2,425.08	7,031.31	0.53	0.04	0.53
19,695.00	89.13	149.290	12,050.43	-6,700.90	2,472.55	7,124.78	0.80	0.00	-0.80
19,788.00	89.22	148.490	12,051.77	-6,780.52	2,520.60	7,217.11	0.87	0.10	-0.86
19,881.00	89.09	148.930	12,053.14	-6,859.98	2,568.89	7,309.41	0.49	-0.14	0.47
19,974.00	89.04	148.320	12,054.66	-6,939.37	2,617.31	7,401.68	0.66	-0.05	-0.66
20,068.00	89.13	149.070	12,056.16	-7,019.67	2,666.14	7,494.97	0.80	0.10	0.80
20,160.00	89.04	148.360	12,057.63	-7,098.29	2,713.91	7,586.27	0.78	-0.10	-0.77
20,253.00	89.09	149.200	12,059.15	-7,177.81	2,762.11	7,678.58	0.90	0.05	0.90
20,347.00	89.04	149.150	12,060.68	-7,258.52	2,810.27	7,771.96	0.08	-0.05	-0.05
20,440.00	89.17	149.290	12,062.14	-7,338.41	2,857.85	7,864.35	0.21	0.14	0.15



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)
20,532.00	89.31	148.540	12,063.36	-7,417.19	2,905.35	7,955.70	0.83	0.15	-0.82
20,627.00	89.13	149.590	12,064.65	-7,498.67	2,954.18	8,050.05	1.12	-0.19	1.11
20,720.00	88.86	150.650	12,066.28	-7,579.29	3,000.50	8,142.59	1.18	-0.29	1.14
20,813.00	89.09	150.260	12,067.94	-7,660.18	3,046.36	8,235.18	0.49	0.25	-0.42
20,907.00	88.91	149.640	12,069.59	-7,741.54	3,093.42	8,328.70	0.69	-0.19	-0.66
20,999.00	88.91	148.400	12,071.34	-7,820.40	3,140.77	8,420.05	1.35	0.00	-1.35
21,092.00	89.09	149.810	12,072.96	-7,900.19	3,188.51	8,512.42	1.53	0.19	1.52
21,186.00	88.69	148.890	12,074.78	-7,981.04	3,236.42	8,605.82	1.07	-0.43	-0.98
21,279.00	88.78	148.760	12,076.83	-8,060.59	3,284.55	8,698.13	0.17	0.10	-0.14
21,373.00	89.00	149.020	12,078.65	-8,141.06	3,333.11	8,791.45	0.36	0.23	0.28
21,466.00	88.86	147.920	12,080.39	-8,220.31	3,381.73	8,883.69	1.19	-0.15	-1.18
21,559.00	88.91	148.180	12,082.20	-8,299.21	3,430.94	8,975.84	0.28	0.05	0.28
21,653.00	89.09	148.320	12,083.84	-8,379.13	3,480.40	9,069.03	0.24	0.19	0.15
21,747.00	88.91	150.480	12,085.48	-8,460.02	3,528.24	9,162.44	2.31	-0.19	2.30
21,841.00	88.69	151.180	12,087.45	-8,542.08	3,574.04	9,256.08	0.78	-0.23	0.74
21,934.00	88.64	150.040	12,089.62	-8,623.09	3,619.67	9,348.69	1.23	-0.05	-1.23
22,028.00	88.82	150.040	12,091.70	-8,704.51	3,666.60	9,442.20	0.19	0.19	0.00
22,121.00	88.91	150.650	12,093.54	-8,785.31	3,712.60	9,534.78	0.66	0.10	0.66
22,215.00	88.91	150.740	12,095.33	-8,867.27	3,758.61	9,628.40	0.10	0.00	0.10
22,307.00	88.69	150.210	12,097.26	-8,947.30	3,803.93	9,720.00	0.62	-0.24	-0.58
22,400.00	88.73	150.170	12,099.35	-9,027.97	3,850.15	9,812.54	0.06	0.04	-0.04
22,493.00	88.86	150.260	12,101.31	-9,108.67	3,896.34	9,905.10	0.17	0.14	0.10
22,587.00	88.91	149.200	12,103.14	-9,189.84	3,943.71	9,998.57	1.13	0.05	-1.13
22,679.00	88.91	149.070	12,104.89	-9,268.79	3,990.90	10,089.95	0.14	0.00	-0.14
22,772.00	88.73	150.390	12,106.80	-9,349.10	4,037.77	10,182.42	1.43	-0.19	1.42
22,866.00	89.04	149.550	12,108.63	-9,430.46	4,084.80	10,275.93	0.95	0.33	-0.89
22,959.00	89.40	150.260	12,109.90	-9,510.92	4,131.43	10,368.44	0.86	0.39	0.76
23,053.00	89.17	149.990	12,111.07	-9,592.42	4,178.25	10,461.99	0.38	-0.24	-0.29
23,146.00	88.95	149.770	12,112.60	-9,672.85	4,224.91	10,554.50	0.33	-0.24	-0.24
23,239.00	88.73	150.080	12,114.48	-9,753.31	4,271.51	10,647.00	0.41	-0.24	0.33
23,332.00	88.86	150.390	12,116.43	-9,834.03	4,317.67	10,739.56	0.36	0.14	0.33
23,425.00	88.78	149.680	12,118.35	-9,914.58	4,364.11	10,832.08	0.77	-0.09	-0.76
23,518.00	88.82	150.170	12,120.30	-9,995.04	4,410.70	10,924.59	0.53	0.04	0.53
23,612.00	88.69	150.560	12,122.34	-10,076.72	4,457.17	11,018.16	0.44	-0.14	0.41
23,705.00	88.73	149.290	12,124.43	-10,157.18	4,503.77	11,110.66	1.37	0.04	-1.37
23,747.00	88.82	148.930	12,125.33	-10,193.21	4,525.32	11,152.37	0.88	0.21	-0.86
Survey @ 23747.00 MD 12125.33 TVD									
23,773.00	88.82	148.930	12,125.87	-10,215.48	4,538.74	11,178.19	0.00	0.00	0.00
Survey Proj. to 23773.00 MD 12125.87 TVD									



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Feb2822

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
184.50	184.50	-0.44	-0.50	MWD surveys
23,747.00	12,125.33	-10,193.21	4,525.32	Survey @ 23747.00 MD 12125.33 TVD
23,773.00	12,125.87	-10,215.48	4,538.74	Survey Proj. to 23773.00 MD 12125.87 TVD



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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-19 HU (slot R)					
Well Position	+N/-S	0.00 ft	Northing:	14,465,147.071 usft	Latitude:	39.830268640
	+E/-W	0.00 ft	Easting:	1,745,231.847 usft	Longitude:	-80.626651390
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	8/21/2022	-8.72	66.44	51,637.18486888

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	155.707	

Survey Program	Date 9/21/2022				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
184.50	1,179.50	MWD surf (Original Hole)	MWD	MWD - Standard	
1,219.50	3,006.50	MWD int (Original Hole)	MWD	MWD - Standard	
3,053.50	5,699.50	MWD 3053.5-5699.5 MD (Original Hole)	MWD	MWD - Standard	
5,714.00	10,911.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
11,002.00	23,747.00	MWD (Original Hole)	MWD	MWD - Standard	
23,773.00	23,773.00	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	14,465,147.071	1,745,231.847	39.830268640	-80.626651390	
184.50	0.41	228.760	184.50	-0.44	-0.50	14,465,146.636	1,745,231.351	39.830267451	-80.626653165	
MWD surveys										
215.50	0.36	253.180	215.50	-0.54	-0.67	14,465,146.534	1,745,231.174	39.830267175	-80.626653795	
245.50	0.34	243.640	245.50	-0.60	-0.84	14,465,146.467	1,745,231.004	39.830266993	-80.626654402	
274.50	0.40	257.790	274.50	-0.66	-1.02	14,465,146.408	1,745,230.828	39.830266832	-80.626655030	



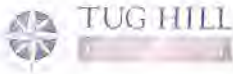
Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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
303.50	0.23	253.630	303.50	-0.70	-1.17	14,465,146.370	1,745,230.674	39.830266730	-80.626655582
331.50	0.45	248.740	331.50	-0.76	-1.33	14,465,146.314	1,745,230.517	39.830266579	-80.626656140
363.50	0.37	246.740	363.49	-0.84	-1.54	14,465,146.228	1,745,230.305	39.830266344	-80.626656896
394.50	0.21	259.380	394.49	-0.89	-1.69	14,465,146.178	1,745,230.157	39.830266208	-80.626657423
426.50	0.28	260.560	426.49	-0.92	-1.82	14,465,146.154	1,745,230.023	39.830266145	-80.626657904
458.50	0.28	283.450	458.49	-0.91	-1.98	14,465,146.160	1,745,229.869	39.830266161	-80.626658449
490.50	0.24	286.300	490.49	-0.87	-2.12	14,465,146.197	1,745,229.729	39.830266264	-80.626658949
521.50	0.26	309.870	521.49	-0.81	-2.23	14,465,146.260	1,745,229.613	39.830266440	-80.626659362
553.50	0.21	261.610	553.49	-0.77	-2.35	14,465,146.298	1,745,229.499	39.830266545	-80.626659766
584.50	0.32	290.350	584.49	-0.75	-2.49	14,465,146.320	1,745,229.362	39.830266607	-80.626660255
616.50	0.45	300.190	616.49	-0.66	-2.68	14,465,146.414	1,745,229.169	39.830266868	-80.626660939
647.50	0.42	298.090	647.49	-0.54	-2.88	14,465,146.529	1,745,228.964	39.830267185	-80.626661669
679.50	0.59	298.130	679.49	-0.41	-3.13	14,465,146.662	1,745,228.715	39.830267553	-80.626662554
711.50	0.49	295.760	711.49	-0.27	-3.40	14,465,146.799	1,745,228.447	39.830267933	-80.626663508
742.50	0.70	323.810	742.49	-0.06	-3.63	14,465,147.009	1,745,228.215	39.830268513	-80.626664328
774.50	0.55	316.730	774.48	0.21	-3.85	14,465,147.279	1,745,227.995	39.830269256	-80.626665110
806.50	0.64	319.280	806.48	0.46	-4.07	14,465,147.526	1,745,227.773	39.830269938	-80.626665897
838.50	0.67	311.260	838.48	0.71	-4.33	14,465,147.785	1,745,227.516	39.830270652	-80.626666809
870.50	0.68	308.370	870.48	0.96	-4.62	14,465,148.026	1,745,227.226	39.830271318	-80.626667837
902.50	0.65	304.040	902.48	1.17	-4.92	14,465,148.246	1,745,226.927	39.830271924	-80.626668900
933.50	0.77	322.990	933.47	1.44	-5.19	14,465,148.510	1,745,226.656	39.830272654	-80.626669861
965.50	0.80	318.570	965.47	1.78	-5.47	14,465,148.850	1,745,226.378	39.830273589	-80.626670844
997.50	0.93	325.100	997.47	2.16	-5.77	14,465,149.230	1,745,226.082	39.830274637	-80.626671894
1,029.50	0.86	312.870	1,029.46	2.54	-6.09	14,465,149.607	1,745,225.757	39.830275674	-80.626673045
1,061.50	0.97	311.510	1,061.46	2.88	-6.47	14,465,149.949	1,745,225.379	39.830276620	-80.626674389
1,092.50	0.85	326.040	1,092.46	3.24	-6.79	14,465,150.314	1,745,225.054	39.830277625	-80.626675541
1,124.50	0.96	320.240	1,124.45	3.65	-7.10	14,465,150.717	1,745,224.750	39.830278735	-80.626676618
1,155.50	0.88	323.470	1,155.45	4.04	-7.41	14,465,151.108	1,745,224.442	39.830279812	-80.626677708
1,179.50	0.96	321.990	1,179.44	4.34	-7.64	14,465,151.414	1,745,224.208	39.830280657	-80.626678536
1,219.50	0.45	304.480	1,219.44	4.70	-7.97	14,465,151.767	1,745,223.872	39.830281630	-80.626679727
1,251.50	0.52	348.970	1,251.44	4.91	-8.11	14,465,151.981	1,745,223.741	39.830282218	-80.626680191
1,282.50	0.52	351.570	1,282.44	5.19	-8.15	14,465,152.258	1,745,223.694	39.830282980	-80.626680356
1,314.50	0.40	332.900	1,314.44	5.43	-8.23	14,465,152.501	1,745,223.621	39.830283648	-80.626680610
1,346.50	0.49	41.820	1,346.44	5.63	-8.19	14,465,152.703	1,745,223.662	39.830284201	-80.626680463
1,378.50	0.48	19.270	1,378.44	5.86	-8.05	14,465,152.931	1,745,223.797	39.830284827	-80.626679977
1,410.50	0.67	49.750	1,410.43	6.11	-7.86	14,465,153.179	1,745,223.984	39.830285504	-80.626679307
1,441.50	0.58	47.170	1,441.43	6.33	-7.61	14,465,153.402	1,745,224.238	39.830286116	-80.626678401
1,473.50	0.62	35.720	1,473.43	6.58	-7.39	14,465,153.653	1,745,224.458	39.830286802	-80.626677615
1,505.50	0.54	37.010	1,505.43	6.84	-7.20	14,465,153.914	1,745,224.649	39.830287516	-80.626676927
1,537.50	0.89	41.480	1,537.43	7.15	-6.94	14,465,154.221	1,745,224.905	39.830288355	-80.626676013
1,569.50	0.82	56.180	1,569.42	7.46	-6.59	14,465,154.534	1,745,225.260	39.830289213	-80.626674745
1,600.50	0.64	44.200	1,600.42	7.71	-6.28	14,465,154.782	1,745,225.565	39.830289889	-80.626673655
1,632.50	0.66	66.440	1,632.42	7.91	-5.99	14,465,154.984	1,745,225.858	39.830290440	-80.626672606
1,664.50	0.62	89.790	1,664.42	7.99	-5.65	14,465,155.058	1,745,226.200	39.830290640	-80.626671386
1,695.50	1.05	106.080	1,695.41	7.91	-5.21	14,465,154.980	1,745,226.641	39.830290421	-80.626669818
1,727.50	1.50	127.150	1,727.41	7.58	-4.59	14,465,154.646	1,745,227.256	39.830289496	-80.626667630
1,759.50	1.88	136.460	1,759.39	6.94	-3.90	14,465,154.012	1,745,227.952	39.830287748	-80.626665163
1,790.50	2.10	121.290	1,790.37	6.28	-3.06	14,465,153.349	1,745,228.787	39.830285916	-80.626662196
1,822.50	2.11	126.530	1,822.35	5.62	-2.09	14,465,152.694	1,745,229.762	39.830284106	-80.626658735
1,854.50	2.17	141.110	1,854.33	4.80	-1.23	14,465,151.871	1,745,230.616	39.830281838	-80.626655707
1,885.50	2.22	140.510	1,885.31	3.88	-0.48	14,465,150.951	1,745,231.366	39.830279303	-80.626653048
1,917.50	1.97	149.400	1,917.29	2.93	0.19	14,465,149.999	1,745,232.040	39.830276681	-80.626650661
1,948.50	1.16	165.170	1,948.27	2.17	0.54	14,465,149.237	1,745,232.392	39.830274585	-80.626649420
1,980.50	0.68	181.700	1,980.27	1.66	0.62	14,465,148.735	1,745,232.469	39.830273203	-80.626649152



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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
2,012.50	0.60	213.710	2,012.27	1.33	0.52	14,465,148.405	1,745,232.370	39.830272300	-80.626649508
2,043.50	0.77	253.490	2,043.27	1.14	0.23	14,465,148.211	1,745,232.080	39.830271770	-80.626650543
2,075.50	1.28	268.050	2,075.26	1.07	-0.33	14,465,148.138	1,745,231.517	39.830271575	-80.626652551
2,107.50	1.15	263.070	2,107.25	1.02	-1.01	14,465,148.087	1,745,230.841	39.830271443	-80.626654960
2,138.50	1.18	279.170	2,138.25	1.03	-1.63	14,465,148.100	1,745,230.217	39.830271487	-80.626657182
2,170.50	0.96	321.780	2,170.24	1.29	-2.12	14,465,148.363	1,745,229.726	39.830272215	-80.626658927
2,201.50	1.44	351.210	2,201.24	1.88	-2.34	14,465,148.952	1,745,229.506	39.830273835	-80.626659703
2,233.50	1.93	4.740	2,233.22	2.82	-2.36	14,465,149.887	1,745,229.489	39.830276401	-80.626659749
2,264.50	2.03	3.960	2,264.20	3.88	-2.28	14,465,150.955	1,745,229.570	39.830279333	-80.626659445
2,296.50	1.63	14.890	2,296.19	4.89	-2.12	14,465,151.960	1,745,229.726	39.830282092	-80.626658874
2,328.50	1.50	21.920	2,328.17	5.72	-1.85	14,465,152.788	1,745,229.999	39.830284364	-80.626657888
2,359.50	1.38	30.230	2,359.17	6.42	-1.51	14,465,153.487	1,745,230.339	39.830286279	-80.626656669
2,391.50	0.85	29.510	2,391.16	6.96	-1.20	14,465,154.027	1,745,230.650	39.830287757	-80.626655553
2,422.50	0.46	183.880	2,422.16	7.03	-1.09	14,465,154.103	1,745,230.755	39.830287965	-80.626655179
2,454.50	0.77	205.440	2,454.16	6.71	-1.19	14,465,153.780	1,745,230.653	39.830287081	-80.626655543
2,485.50	1.07	211.410	2,485.15	6.27	-1.43	14,465,153.345	1,745,230.413	39.830285888	-80.626656406
2,548.50	1.34	206.640	2,548.14	5.11	-2.07	14,465,152.185	1,745,229.776	39.830282709	-80.626658691
2,580.50	1.05	216.590	2,580.13	4.54	-2.41	14,465,151.615	1,745,229.434	39.830281148	-80.626659920
2,612.50	0.85	245.120	2,612.13	4.21	-2.80	14,465,151.280	1,745,229.044	39.830280231	-80.626661315
2,644.50	0.91	271.700	2,644.12	4.12	-3.27	14,465,151.187	1,745,228.574	39.830279983	-80.626662988
2,675.50	0.73	298.730	2,675.12	4.22	-3.69	14,465,151.290	1,745,228.155	39.830280269	-80.626664479
2,738.50	1.37	25.700	2,738.11	5.09	-3.72	14,465,152.161	1,745,228.130	39.830282663	-80.626664557
2,769.50	1.35	28.520	2,769.10	5.75	-3.38	14,465,152.816	1,745,228.465	39.830284457	-80.626663353
2,801.50	1.30	41.680	2,801.10	6.35	-2.96	14,465,153.418	1,745,228.886	39.830286106	-80.626661844
2,833.50	1.29	62.830	2,833.09	6.78	-2.40	14,465,153.854	1,745,229.448	39.830287296	-80.626659836
2,865.50	1.17	55.940	2,865.08	7.13	-1.81	14,465,154.201	1,745,230.039	39.830288244	-80.626657725
2,896.50	0.93	70.130	2,896.07	7.39	-1.31	14,465,154.464	1,745,230.538	39.830288959	-80.626655945
2,928.50	0.81	69.460	2,928.07	7.56	-0.85	14,465,154.632	1,745,230.994	39.830289415	-80.626654318
2,959.50	0.61	99.770	2,959.07	7.61	-0.49	14,465,154.681	1,745,231.362	39.830289545	-80.626653007
2,991.50	0.46	77.030	2,991.07	7.61	-0.19	14,465,154.681	1,745,231.655	39.830289541	-80.626651963
3,006.50	0.33	91.460	3,006.07	7.62	-0.09	14,465,154.693	1,745,231.757	39.830289574	-80.626651600
3,053.50	0.31	17.260	3,053.07	7.74	0.08	14,465,154.811	1,745,231.930	39.830289896	-80.626650982
3,085.50	0.46	14.570	3,085.07	7.95	0.14	14,465,155.018	1,745,231.988	39.830290464	-80.626650772
3,117.50	0.58	5.040	3,117.06	8.23	0.19	14,465,155.304	1,745,232.034	39.830291248	-80.626650602
3,149.50	0.70	353.930	3,149.06	8.59	0.18	14,465,155.659	1,745,232.028	39.830292225	-80.626650620
3,181.50	0.75	349.690	3,181.06	8.99	0.12	14,465,156.060	1,745,231.970	39.830293325	-80.626650821
3,212.50	0.73	341.010	3,212.06	9.38	0.02	14,465,156.446	1,745,231.869	39.830294387	-80.626651174
3,244.50	0.71	328.530	3,244.05	9.74	-0.15	14,465,156.808	1,745,231.699	39.830295383	-80.626651773
3,276.50	0.70	333.710	3,276.05	10.08	-0.34	14,465,157.152	1,745,231.509	39.830296331	-80.626652445
3,308.50	0.78	331.660	3,308.05	10.45	-0.53	14,465,157.519	1,745,231.319	39.830297341	-80.626653116
3,339.50	0.68	324.580	3,339.05	10.78	-0.73	14,465,157.855	1,745,231.112	39.830298265	-80.626653848
3,370.50	0.60	308.780	3,370.05	11.04	-0.97	14,465,158.106	1,745,230.879	39.830298958	-80.626654675
3,402.50	0.55	303.540	3,402.04	11.23	-1.23	14,465,158.296	1,745,230.621	39.830299482	-80.626655593
3,434.50	0.45	278.060	3,434.04	11.33	-1.48	14,465,158.399	1,745,230.368	39.830299767	-80.626656491
3,465.50	0.44	250.720	3,465.04	11.31	-1.71	14,465,158.376	1,745,230.135	39.830299708	-80.626657320
3,496.50	0.52	245.950	3,496.04	11.21	-1.95	14,465,158.280	1,745,229.895	39.830299446	-80.626658180
3,527.50	0.73	255.620	3,527.04	11.10	-2.27	14,465,158.173	1,745,229.575	39.830299157	-80.626659320
3,559.50	1.07	273.520	3,559.03	11.07	-2.77	14,465,158.141	1,745,229.079	39.830299074	-80.626661086
3,591.50	1.51	279.240	3,591.03	11.16	-3.51	14,465,158.232	1,745,228.337	39.830299331	-80.626663727
3,622.50	2.24	286.120	3,622.01	11.40	-4.52	14,465,158.470	1,745,227.325	39.830299997	-80.626667328
3,652.50	2.68	290.060	3,651.98	11.80	-5.74	14,465,158.873	1,745,226.103	39.830301119	-80.626671675
3,684.50	2.87	293.110	3,683.94	12.37	-7.18	14,465,159.444	1,745,224.664	39.830302703	-80.626676794
3,715.50	2.97	294.900	3,714.90	13.02	-8.63	14,465,160.087	1,745,223.221	39.830304485	-80.626681922
3,747.50	2.97	295.050	3,746.86	13.72	-10.13	14,465,160.787	1,745,221.718	39.830306425	-80.626687265



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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	
3,778.50	2.97	297.260	3,777.82	14.42	-11.57	14,465,161.495	1,745,220.277	39.830308385	-80.626692389	
3,810.50	2.95	296.040	3,809.78	15.17	-13.05	14,465,162.236	1,745,218.800	39.830310438	-80.626697638	
3,842.50	2.92	297.710	3,841.73	15.91	-14.51	14,465,162.977	1,745,217.339	39.830312488	-80.626702832	
3,872.50	2.97	297.070	3,871.69	16.61	-15.88	14,465,163.686	1,745,215.970	39.830314451	-80.626707696	
3,903.50	3.02	296.900	3,902.65	17.35	-17.32	14,465,164.421	1,745,214.527	39.830316485	-80.626712826	
3,935.50	3.10	298.880	3,934.61	18.15	-18.83	14,465,165.220	1,745,213.018	39.830318698	-80.626718191	
3,967.50	3.03	301.130	3,966.56	19.00	-20.31	14,465,166.075	1,745,211.536	39.830321063	-80.626723455	
3,998.50	2.82	305.700	3,997.52	19.87	-21.63	14,465,166.944	1,745,210.215	39.830323464	-80.626728146	
4,029.50	2.84	309.080	4,028.48	20.80	-22.85	14,465,167.873	1,745,209.000	39.830326029	-80.626732462	
4,061.50	2.83	314.000	4,060.44	21.85	-24.03	14,465,168.921	1,745,207.816	39.830328922	-80.626736662	
4,093.50	2.79	314.430	4,092.40	22.94	-25.16	14,465,170.015	1,745,206.692	39.830331939	-80.626740651	
4,125.50	2.85	315.500	4,124.37	24.06	-26.27	14,465,171.128	1,745,205.578	39.830335007	-80.626744602	
4,157.50	2.91	318.340	4,156.33	25.23	-27.37	14,465,172.302	1,745,204.481	39.830338245	-80.626748493	
4,188.50	2.96	321.290	4,187.28	26.44	-28.39	14,465,173.514	1,745,203.457	39.830341586	-80.626752121	
4,219.50	3.13	322.230	4,218.24	27.74	-29.41	14,465,174.808	1,745,202.438	39.830345150	-80.626755731	
4,251.50	3.20	321.950	4,250.19	29.13	-30.50	14,465,176.202	1,745,201.352	39.830348991	-80.626759577	
4,282.50	3.16	323.210	4,281.14	30.50	-31.54	14,465,177.568	1,745,200.307	39.830352753	-80.626763279	
4,314.50	3.28	325.030	4,313.09	31.95	-32.59	14,465,179.024	1,745,199.255	39.830356765	-80.626767008	
4,345.50	3.19	324.180	4,344.04	33.38	-33.61	14,465,180.450	1,745,198.241	39.830360693	-80.626770595	
4,377.50	2.87	322.240	4,376.00	34.73	-34.62	14,465,181.805	1,745,197.230	39.830364426	-80.626774178	
4,408.50	2.70	318.780	4,406.96	35.90	-35.57	14,465,182.968	1,745,196.273	39.830367631	-80.626777568	
4,439.50	2.57	318.300	4,437.93	36.97	-36.52	14,465,184.036	1,745,195.330	39.830370575	-80.626780912	
4,471.50	2.67	319.690	4,469.90	38.07	-37.48	14,465,185.140	1,745,194.371	39.830373618	-80.626784313	
4,502.50	2.75	321.800	4,500.86	39.20	-38.40	14,465,186.275	1,745,193.444	39.830376745	-80.626787598	
4,534.50	2.85	324.840	4,532.82	40.46	-39.34	14,465,187.529	1,745,192.511	39.830380199	-80.626790902	
4,564.50	3.08	326.980	4,562.78	41.74	-40.21	14,465,188.815	1,745,191.642	39.830383739	-80.626793977	
4,595.50	3.26	327.320	4,593.74	43.18	-41.14	14,465,190.255	1,745,190.712	39.830387705	-80.626797268	
4,627.50	3.26	324.890	4,625.68	44.69	-42.15	14,465,191.765	1,745,189.698	39.830391864	-80.626800859	
4,658.50	3.03	317.620	4,656.64	46.02	-43.21	14,465,193.091	1,745,188.638	39.830395518	-80.626804612	
4,690.50	3.08	314.320	4,688.59	47.25	-44.39	14,465,194.317	1,745,187.453	39.830398897	-80.626808815	
4,721.50	3.25	312.330	4,719.55	48.42	-45.64	14,465,195.490	1,745,186.208	39.830402134	-80.626813234	
4,753.50	3.43	312.080	4,751.49	49.67	-47.02	14,465,196.743	1,745,184.827	39.830405589	-80.626818135	
4,783.50	3.43	312.280	4,781.44	50.88	-48.35	14,465,197.948	1,745,183.497	39.830408914	-80.626822855	
4,815.50	2.86	314.410	4,813.39	52.08	-49.63	14,465,199.150	1,745,182.218	39.830412231	-80.626827391	
4,845.50	2.76	315.980	4,843.35	53.12	-50.67	14,465,200.194	1,745,181.182	39.830415108	-80.626831067	
4,876.50	2.81	317.520	4,874.32	54.22	-51.70	14,465,201.291	1,745,180.150	39.830418133	-80.626834726	
4,908.50	3.02	319.610	4,906.27	55.44	-52.77	14,465,202.511	1,745,179.074	39.830421497	-80.626838541	
4,940.50	3.26	319.670	4,938.23	56.78	-53.91	14,465,203.847	1,745,177.939	39.830425178	-80.626842564	
4,972.50	3.34	319.150	4,970.17	58.18	-55.11	14,465,205.246	1,745,176.740	39.830429033	-80.626846812	
5,003.50	2.93	319.070	5,001.13	59.46	-56.22	14,465,206.527	1,745,175.630	39.830432565	-80.626850746	
5,035.50	2.58	318.050	5,033.09	60.61	-57.23	14,465,207.681	1,745,174.613	39.830435745	-80.626854352	
5,066.50	2.16	318.510	5,064.06	61.57	-58.09	14,465,208.637	1,745,173.760	39.830438381	-80.626857378	
5,098.50	2.09	317.410	5,096.04	62.45	-58.88	14,465,209.519	1,745,172.965	39.830440811	-80.626860194	
5,130.50	1.92	315.760	5,128.02	63.26	-59.65	14,465,210.332	1,745,172.197	39.830443054	-80.626862921	
5,162.50	1.40	313.500	5,160.01	63.91	-60.31	14,465,210.985	1,745,171.539	39.830444855	-80.626865253	
5,194.50	1.05	312.380	5,192.00	64.38	-60.81	14,465,211.452	1,745,171.039	39.830446143	-80.626867028	
5,225.50	0.95	310.440	5,223.00	64.74	-61.21	14,465,211.810	1,745,170.633	39.830447131	-80.626868467	
5,257.50	0.68	307.170	5,254.99	65.03	-61.57	14,465,212.097	1,745,170.280	39.830447922	-80.626869721	
5,289.50	0.38	269.210	5,286.99	65.14	-61.82	14,465,212.210	1,745,170.023	39.830448236	-80.626870636	
5,320.50	0.23	242.140	5,317.99	65.11	-61.98	14,465,212.180	1,745,169.865	39.830448155	-80.626871198	
5,352.50	0.28	210.040	5,349.99	65.01	-62.06	14,465,212.082	1,745,169.769	39.830447887	-80.626871541	
5,383.50	0.36	186.490	5,380.99	64.85	-62.13	14,465,211.920	1,745,169.720	39.830447442	-80.626871718	
5,415.50	0.36	182.460	5,412.99	64.65	-62.14	14,465,211.720	1,745,169.704	39.830446892	-80.626871777	
5,447.50	0.49	171.200	5,444.99	64.41	-62.13	14,465,211.484	1,745,169.721	39.830446245	-80.626871721	



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,479.50	0.69	169.870	5,476.99	64.09	-62.07	14,465,211.159	1,745,169.776	39.830445352	-80.626871531
5,510.50	0.77	161.690	5,507.98	63.71	-61.97	14,465,210.777	1,745,169.874	39.830444303	-80.626871186
5,541.50	0.85	161.750	5,538.98	63.29	-61.84	14,465,210.361	1,745,170.012	39.830443159	-80.626870703
5,573.50	1.05	154.890	5,570.98	62.80	-61.64	14,465,209.870	1,745,170.210	39.830441808	-80.626870002
5,604.50	1.22	158.420	5,601.97	62.24	-61.40	14,465,209.306	1,745,170.452	39.830440256	-80.626869149
5,636.50	1.28	158.400	5,633.96	61.59	-61.14	14,465,208.657	1,745,170.709	39.830438471	-80.626868244
5,667.50	1.11	158.430	5,664.96	60.99	-60.90	14,465,208.056	1,745,170.947	39.830436817	-80.626867405
5,699.50	1.06	166.480	5,696.95	60.41	-60.72	14,465,207.480	1,745,171.130	39.830435233	-80.626866762
5,714.00	0.91	170.340	5,711.45	60.17	-60.67	14,465,207.236	1,745,171.181	39.830434563	-80.626867585
5,808.00	0.77	189.810	5,805.44	58.81	-60.65	14,465,205.878	1,745,171.198	39.830430833	-80.626866542
5,901.00	0.91	198.390	5,898.43	57.49	-60.99	14,465,204.561	1,745,170.859	39.830427221	-80.626867771
5,995.00	1.15	199.170	5,992.41	55.89	-61.53	14,465,202.962	1,745,170.314	39.830422835	-80.626869737
6,089.00	0.43	196.880	6,086.40	54.66	-61.95	14,465,201.734	1,745,169.902	39.830419466	-80.626871223
6,183.00	0.26	97.430	6,180.40	54.30	-61.84	14,465,201.368	1,745,170.011	39.830418462	-80.626870840
6,277.00	0.22	109.270	6,274.40	54.21	-61.46	14,465,201.281	1,745,170.392	39.830418219	-80.626869481
6,370.00	0.34	109.920	6,367.40	54.06	-61.03	14,465,201.128	1,745,170.820	39.830417794	-80.626867959
6,463.00	0.34	117.800	6,460.40	53.84	-60.52	14,465,200.906	1,745,171.324	39.830417176	-80.626866169
6,557.00	0.43	118.640	6,554.40	53.54	-59.97	14,465,200.606	1,745,171.880	39.830416348	-80.626864192
6,649.00	0.46	328.000	6,646.40	53.68	-59.86	14,465,200.754	1,745,171.988	39.830416753	-80.626863808
6,743.00	0.94	313.760	6,740.39	54.54	-60.62	14,465,201.608	1,745,171.231	39.830419105	-80.626866491
6,836.00	1.07	317.400	6,833.37	55.70	-61.76	14,465,202.774	1,745,170.092	39.830422322	-80.626870529
6,899.00	0.91	315.950	6,896.37	56.50	-62.50	14,465,203.567	1,745,169.346	39.830424507	-80.626873175
6,991.00	0.67	310.260	6,988.36	57.37	-63.42	14,465,204.440	1,745,168.428	39.830426914	-80.626876433
7,061.00	1.15	279.790	7,058.35	57.75	-64.42	14,465,204.824	1,745,167.423	39.830427980	-80.626880006
7,116.00	1.82	287.850	7,113.33	58.11	-65.80	14,465,205.185	1,745,166.048	39.830428989	-80.626884899
7,208.00	3.33	282.570	7,205.23	59.14	-69.80	14,465,206.214	1,745,162.049	39.830431862	-80.626899127
7,348.00	6.53	283.180	7,344.70	61.84	-81.52	14,465,208.915	1,745,150.326	39.830439413	-80.626940841
7,395.00	7.08	282.200	7,391.37	63.07	-86.95	14,465,210.137	1,745,144.893	39.830442829	-80.626960176
7,488.00	9.08	281.060	7,483.44	65.69	-99.76	14,465,212.756	1,745,132.088	39.830450169	-80.627005748
7,595.00	11.00	279.240	7,588.80	68.94	-118.12	14,465,216.015	1,745,113.724	39.830459329	-80.627071110
7,675.00	11.70	278.780	7,667.23	71.41	-133.67	14,465,218.479	1,745,098.174	39.830466273	-80.627126461
7,768.00	12.72	278.590	7,758.13	74.38	-153.12	14,465,221.447	1,745,078.731	39.830474649	-80.627195672
7,861.00	13.66	279.720	7,848.67	77.76	-174.07	14,465,224.831	1,745,057.783	39.830484180	-80.627270237
8,092.00	17.52	279.420	8,071.13	88.06	-235.27	14,465,235.131	1,744,996.574	39.830513166	-80.627488106
8,140.00	17.62	278.750	8,116.89	90.35	-249.58	14,465,237.418	1,744,982.266	39.830519612	-80.627539035
8,234.00	19.50	278.030	8,206.00	94.70	-279.18	14,465,241.775	1,744,952.667	39.830531913	-80.627644400
8,327.00	19.77	277.200	8,293.59	98.84	-310.16	14,465,245.914	1,744,921.692	39.830543636	-80.627754666
8,421.00	19.75	279.150	8,382.06	103.36	-341.61	14,465,250.432	1,744,890.240	39.830556403	-80.627866630
8,514.00	20.98	279.700	8,469.24	108.67	-373.53	14,465,255.736	1,744,858.315	39.830571334	-80.627980267
8,607.00	21.33	278.410	8,555.98	113.94	-406.68	14,465,261.015	1,744,825.172	39.830586209	-80.628098242
8,701.00	21.00	277.460	8,643.63	118.63	-440.29	14,465,265.702	1,744,791.559	39.830599465	-80.628217898
8,795.00	20.16	279.980	8,731.64	123.63	-472.94	14,465,270.697	1,744,758.904	39.830613553	-80.628334139
8,889.00	19.24	280.890	8,820.13	129.36	-504.11	14,465,276.430	1,744,727.741	39.830629653	-80.628445052
8,982.00	15.89	279.540	8,908.79	134.37	-531.72	14,465,281.436	1,744,700.131	39.830643717	-80.628543324
9,076.00	16.30	282.660	8,999.10	139.39	-557.28	14,465,286.460	1,744,674.570	39.830657805	-80.628634297
9,263.00	19.22	284.560	9,177.17	152.88	-612.69	14,465,299.953	1,744,619.162	39.830695489	-80.628831457
9,355.00	20.69	284.760	9,263.65	160.83	-643.06	14,465,307.900	1,744,588.787	39.830717662	-80.628939530
9,448.00	21.42	285.730	9,350.44	169.62	-675.29	14,465,316.690	1,744,556.554	39.830742167	-80.629054213
9,541.00	21.91	285.490	9,436.87	178.86	-708.36	14,465,325.928	1,744,523.487	39.830767913	-80.629171859
9,645.00	22.40	282.050	9,533.19	188.18	-746.44	14,465,335.247	1,744,485.407	39.830793940	-80.629307359
9,788.00	22.93	281.420	9,665.15	199.38	-800.39	14,465,346.451	1,744,431.455	39.830825322	-80.629499367
9,820.00	23.01	280.950	9,694.61	201.80	-812.64	14,465,348.874	1,744,419.204	39.830832113	-80.629542967
9,913.00	21.34	278.370	9,780.73	207.72	-847.23	14,465,354.790	1,744,384.615	39.830848754	-80.629666087
10,007.00	23.39	277.420	9,867.66	212.62	-882.66	14,465,359.690	1,744,349.187	39.830862613	-80.629792204



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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
10,101.00	21.94	279.900	9,954.40	218.05	-918.47	14,465,365.119	1,744,313.383	39.830877930	-80.629919656
10,194.00	20.31	281.590	10,041.15	224.28	-951.40	14,465,371.349	1,744,280.454	39.830895413	-80.630036854
10,287.00	18.97	283.930	10,128.73	231.16	-981.88	14,465,378.231	1,744,249.970	39.830914659	-80.630145336
10,380.00	16.95	282.120	10,217.20	237.65	-1,009.81	14,465,384.717	1,744,222.041	39.830932788	-80.630244720
10,473.00	16.79	278.140	10,306.20	242.40	-1,036.36	14,465,389.466	1,744,195.489	39.830946129	-80.630339227
10,567.00	17.46	274.640	10,396.03	245.46	-1,063.86	14,465,392.529	1,744,167.993	39.830954854	-80.630437123
10,660.00	17.56	275.490	10,484.73	247.93	-1,091.73	14,465,395.000	1,744,140.122	39.830961955	-80.630536361
10,753.00	17.66	277.010	10,573.37	250.99	-1,119.69	14,465,398.063	1,744,112.156	39.830970686	-80.630635930
10,846.00	17.91	278.680	10,661.92	254.87	-1,147.83	14,465,401.943	1,744,084.018	39.830981660	-80.630736096
10,911.00	18.22	280.170	10,723.72	258.18	-1,167.71	14,465,405.246	1,744,064.136	39.830990955	-80.630806867
11,002.00	19.49	284.350	10,809.84	264.45	-1,196.43	14,465,411.521	1,744,035.424	39.831008513	-80.630909046
11,039.00	19.53	281.440	10,844.72	267.21	-1,208.47	14,465,414.277	1,744,023.382	39.831016219	-80.630951898
11,094.00	18.69	271.710	10,896.70	269.29	-1,226.29	14,465,416.364	1,744,005.558	39.831022152	-80.631015354
11,141.00	17.32	255.620	10,941.42	267.78	-1,240.61	14,465,414.850	1,743,991.245	39.831018157	-80.631066361
11,187.00	17.01	243.680	10,985.39	263.09	-1,253.27	14,465,410.165	1,743,978.577	39.831005434	-80.631111551
11,234.00	17.23	234.380	11,030.31	255.99	-1,265.10	14,465,403.061	1,743,966.754	39.830986060	-80.631153767
11,280.00	17.50	223.720	11,074.23	247.02	-1,275.42	14,465,394.093	1,743,956.433	39.830961547	-80.631190661
11,327.00	17.45	212.830	11,119.07	235.99	-1,284.12	14,465,383.061	1,743,947.727	39.830931350	-80.631221836
11,374.00	17.50	203.930	11,163.91	223.61	-1,290.81	14,465,370.678	1,743,941.038	39.830897420	-80.631245841
11,421.00	17.32	198.330	11,208.76	210.51	-1,295.88	14,465,357.577	1,743,935.972	39.830861498	-80.631264081
11,469.00	17.37	194.940	11,254.58	196.80	-1,299.97	14,465,343.871	1,743,931.877	39.830823906	-80.631278666
11,516.00	18.29	193.790	11,299.32	182.86	-1,303.54	14,465,329.930	1,743,928.311	39.830591661	-80.631291775
11,562.00	20.55	192.910	11,342.70	167.98	-1,307.06	14,465,315.049	1,743,924.786	39.830744833	-80.631304549
11,609.00	23.51	192.210	11,386.26	150.77	-1,310.89	14,465,297.842	1,743,920.959	39.830697623	-80.631318431
11,657.00	26.38	190.670	11,429.78	130.93	-1,314.89	14,465,278.001	1,743,916.959	39.830643181	-80.631332970
11,698.00	28.90	187.230	11,466.10	112.15	-1,317.82	14,465,259.217	1,743,914.025	39.830591630	-80.631343697
11,751.00	31.73	180.790	11,511.86	85.49	-1,319.63	14,465,232.564	1,743,912.220	39.830518455	-80.631350516
11,798.00	34.47	175.990	11,551.24	59.86	-1,318.87	14,465,206.929	1,743,912.980	39.830448047	-80.631348186
11,846.00	37.07	171.940	11,590.19	31.98	-1,315.89	14,465,179.046	1,743,915.960	39.830371441	-80.631337983
11,893.00	39.95	169.560	11,626.96	3.10	-1,311.17	14,465,150.173	1,743,920.681	39.830292095	-80.631321589
11,939.00	43.22	167.400	11,661.37	-26.80	-1,305.05	14,465,120.268	1,743,926.795	39.830209900	-80.631300250
11,986.00	46.49	166.740	11,694.68	-59.11	-1,297.63	14,465,087.965	1,743,934.217	39.830121105	-80.631274289
12,034.00	50.42	165.110	11,726.51	-93.94	-1,288.88	14,465,053.131	1,743,942.967	39.830025345	-80.631243636
12,081.00	54.00	162.330	11,755.31	-129.57	-1,278.45	14,465,017.497	1,743,953.396	39.829927366	-80.631207010
12,128.00	57.05	160.350	11,781.91	-166.27	-1,266.05	14,464,980.799	1,743,965.802	39.829856446	-80.631163361
12,175.00	59.48	159.020	11,806.63	-203.75	-1,252.17	14,464,943.319	1,743,979.684	39.829723360	-80.631114465
12,222.00	61.69	158.450	11,829.71	-241.90	-1,237.32	14,464,905.169	1,743,994.534	39.829618424	-80.631062133
12,269.00	63.94	158.100	11,851.18	-280.74	-1,221.84	14,464,866.333	1,744,010.009	39.829511598	-80.631007582
12,317.00	66.15	157.570	11,871.44	-321.04	-1,205.42	14,464,826.034	1,744,026.428	39.829400741	-80.630949692
12,364.00	68.54	157.860	11,889.54	-361.14	-1,188.91	14,464,785.932	1,744,042.945	39.829290424	-80.630891452
12,411.00	71.01	156.650	11,905.78	-401.78	-1,171.78	14,464,745.294	1,744,060.068	39.829178631	-80.630831059
12,458.00	74.50	156.290	11,919.72	-442.93	-1,153.86	14,464,704.146	1,744,077.987	39.829065427	-80.630767840
12,505.00	78.26	155.060	11,930.78	-484.54	-1,135.05	14,464,662.533	1,744,096.802	39.828950935	-80.630701435
12,552.00	81.62	153.520	11,938.99	-526.23	-1,114.97	14,464,620.846	1,744,116.877	39.828836225	-80.630630544
12,599.00	84.89	152.190	11,944.51	-567.75	-1,093.68	14,464,579.320	1,744,138.170	39.828721944	-80.630555312
12,646.00	88.25	151.180	11,947.32	-609.05	-1,071.43	14,464,538.024	1,744,160.420	39.828608285	-80.630476668
12,693.00	88.47	152.020	11,948.67	-650.37	-1,049.08	14,464,496.698	1,744,182.765	39.828494541	-80.630397688
12,777.00	88.56	151.450	11,951.10	-733.14	-1,004.59	14,464,413.935	1,744,227.264	39.828266748	-80.630240411
12,881.00	88.82	150.340	11,953.25	-815.25	-958.88	14,464,331.827	1,744,272.974	39.828040744	-80.630078811
12,975.00	89.26	147.920	11,954.83	-895.91	-910.66	14,464,251.161	1,744,321.194	39.827818671	-80.629908250
13,069.00	90.05	150.040	11,955.39	-976.46	-862.22	14,464,170.511	1,744,369.632	39.827596913	-80.629736914
13,163.00	89.97	150.080	11,955.36	-1,057.92	-815.30	14,464,089.156	1,744,416.546	39.827372685	-80.629571016
13,257.00	89.93	150.480	11,955.44	-1,139.55	-768.70	14,464,007.521	1,744,463.148	39.827147968	-80.629406238
13,351.00	89.88	150.560	11,955.60	-1,221.38	-722.44	14,463,925.692	1,744,509.407	39.826922721	-80.629242683



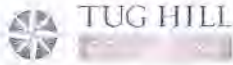
Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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
13,445.00	89.97	149.990	11,955.72	-1,303.01	-675.83	14,463,844.061	1,744,556.015	39.826698015	-80.629077883
13,539.00	89.35	150.480	11,956.28	-1,384.61	-629.17	14,463,762.465	1,744,602.680	39.826473403	-80.628912883
13,634.00	89.35	150.040	11,957.36	-1,467.09	-582.05	14,463,679.984	1,744,649.802	39.826246354	-80.628746264
13,730.00	89.44	150.610	11,958.37	-1,550.49	-534.52	14,463,596.580	1,744,697.327	39.826016766	-80.628578229
13,823.00	89.26	150.390	11,959.43	-1,631.43	-488.73	14,463,515.642	1,744,743.119	39.825793971	-80.628416329
13,916.00	89.09	150.300	11,960.77	-1,712.24	-442.72	14,463,434.832	1,744,789.129	39.825571523	-80.628253655
14,008.00	89.17	150.390	11,962.16	-1,792.18	-397.21	14,463,354.891	1,744,834.643	39.825351470	-80.628092733
14,101.00	89.13	149.510	11,963.54	-1,872.67	-350.64	14,463,274.401	1,744,881.207	39.825129895	-80.627928079
14,194.00	89.09	148.490	11,964.99	-1,952.38	-302.75	14,463,194.695	1,744,929.099	39.824932229	-80.627758686
14,288.00	89.00	148.890	11,966.55	-2,032.68	-253.91	14,463,114.396	1,744,977.941	39.824689382	-80.627585920
14,381.00	89.09	148.580	11,968.10	-2,112.16	-205.65	14,463,034.914	1,745,026.201	39.824470552	-80.627415216
14,474.00	89.09	148.180	11,969.58	-2,191.35	-156.89	14,462,955.730	1,745,074.953	39.824252540	-80.627242756
14,568.00	89.13	148.540	11,971.04	-2,271.36	-107.59	14,462,875.712	1,745,124.258	39.824032229	-80.627068342
14,661.00	89.17	148.760	11,972.42	-2,350.78	-59.21	14,462,796.299	1,745,172.637	39.823813588	-80.626897216
14,754.00	89.13	149.240	11,973.80	-2,430.48	-11.32	14,462,716.591	1,745,220.530	39.823594145	-80.626727826
14,847.00	89.09	148.670	11,975.24	-2,510.15	36.64	14,462,636.923	1,745,268.485	39.823374808	-80.626558216
14,939.00	89.13	148.670	11,976.67	-2,588.73	84.47	14,462,558.347	1,745,316.316	39.823158474	-80.626389032
15,032.00	89.09	148.580	11,978.12	-2,668.12	132.88	14,462,478.955	1,745,364.729	39.822939892	-80.626217788
15,125.00	89.09	148.710	11,979.60	-2,747.53	181.27	14,462,399.547	1,745,413.114	39.822721264	-80.626046645
15,219.00	89.13	149.290	11,981.06	-2,828.09	229.67	14,462,318.984	1,745,461.522	39.822499464	-80.625875441
15,312.00	89.09	149.330	11,982.50	-2,908.06	277.14	14,462,239.019	1,745,508.983	39.822279318	-80.625707601
15,406.00	89.17	149.460	11,983.93	-2,988.95	324.99	14,462,158.123	1,745,556.834	39.822056610	-80.625538385
15,499.00	89.04	149.510	11,985.38	-3,069.06	372.20	14,462,078.014	1,745,604.050	39.821836069	-80.625371421
15,593.00	89.13	149.590	11,986.88	-3,150.09	419.84	14,461,996.990	1,745,651.682	39.821613011	-80.625202991
15,687.00	89.09	149.550	11,988.34	-3,231.13	467.44	14,461,915.948	1,745,699.286	39.821399066	-80.625034662
15,780.00	89.09	150.080	11,989.82	-3,311.51	514.19	14,461,835.569	1,745,746.039	39.821186829	-80.624869352
15,874.00	89.13	150.170	11,991.28	-3,393.01	561.01	14,461,754.070	1,745,792.856	39.820944276	-80.624703835
15,967.00	89.26	149.290	11,992.58	-3,473.32	607.88	14,461,673.759	1,745,839.730	39.820723183	-80.624538098
16,060.00	89.13	149.680	11,993.89	-3,553.43	655.10	14,461,593.648	1,745,886.947	39.820502637	-80.624371137
16,152.00	89.04	150.430	11,995.36	-3,633.14	701.02	14,461,513.940	1,745,932.864	39.820283213	-80.624208800
16,246.00	89.00	150.390	11,996.97	-3,714.87	747.43	14,461,432.212	1,745,979.273	39.820062823	-80.624044741
16,338.00	89.04	150.480	11,998.54	-3,794.88	792.81	14,461,352.202	1,746,024.660	39.819837986	-80.623884299
16,431.00	89.13	149.860	12,000.03	-3,875.54	839.07	14,461,271.535	1,746,070.915	39.819615922	-80.623720778
16,524.00	89.13	150.040	12,001.44	-3,956.03	885.63	14,461,191.045	1,746,117.480	39.819394340	-80.623556150
16,617.00	89.09	150.080	12,002.88	-4,036.61	932.04	14,461,110.466	1,746,163.890	39.819172516	-80.623392077
16,711.00	89.04	150.430	12,004.42	-4,118.22	978.68	14,461,028.862	1,746,210.521	39.818947875	-80.623227233
16,804.00	89.17	149.730	12,005.87	-4,198.81	1,025.06	14,460,948.268	1,746,256.902	39.818726008	-80.623063263
16,897.00	89.13	149.550	12,007.25	-4,279.05	1,072.06	14,460,868.030	1,746,303.902	39.818505114	-80.622897087
16,990.00	89.17	149.990	12,008.63	-4,359.39	1,118.87	14,460,787.686	1,746,350.719	39.818283930	-80.622731563
17,083.00	89.17	149.950	12,009.98	-4,439.90	1,165.41	14,460,707.179	1,746,397.257	39.818062300	-80.622567040
17,177.00	89.09	149.990	12,011.40	-4,521.27	1,212.45	14,460,625.807	1,746,444.294	39.817838289	-80.622400751
17,269.00	89.13	149.810	12,012.83	-4,600.86	1,258.58	14,460,546.223	1,746,490.427	39.817619198	-80.622237655
17,362.00	89.09	149.990	12,014.28	-4,681.31	1,305.22	14,460,465.773	1,746,537.062	39.817397726	-80.622072788
17,456.00	89.09	149.860	12,015.77	-4,762.64	1,352.32	14,460,384.439	1,746,584.162	39.817173818	-80.621906276
17,550.00	89.17	149.420	12,017.20	-4,843.74	1,399.82	14,460,303.339	1,746,631.667	39.816950549	-80.621738322
17,642.00	89.04	150.260	12,018.63	-4,923.28	1,446.04	14,460,223.804	1,746,677.883	39.816731592	-80.621574934
17,736.00	89.13	149.370	12,020.14	-5,004.52	1,493.29	14,460,142.561	1,746,725.139	39.816507932	-80.621407870
17,829.00	89.09	149.900	12,021.58	-5,084.75	1,540.30	14,460,062.329	1,746,772.146	39.816287050	-80.621241682
17,922.00	89.04	149.810	12,023.10	-5,165.16	1,587.00	14,459,981.918	1,746,818.843	39.816065679	-80.621076597
18,014.00	89.09	149.990	12,024.60	-5,244.75	1,633.13	14,459,902.334	1,746,864.976	39.815846589	-80.620913511
18,108.00	89.17	149.370	12,026.03	-5,325.88	1,680.58	14,459,821.202	1,746,912.424	39.815623229	-80.620745766
18,200.00	89.31	149.860	12,027.25	-5,405.24	1,727.11	14,459,741.846	1,746,958.954	39.815404758	-80.620581264
18,294.00	89.22	150.610	12,028.45	-5,486.83	1,773.77	14,459,660.255	1,747,005.815	39.815180148	-80.620416330
18,388.00	89.04	150.210	12,029.88	-5,568.56	1,820.18	14,459,578.524	1,747,052.026	39.814955156	-80.620252291



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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
18,481.00	88.95	150.650	12,031.51	-5,649.43	1,866.07	14,459,497.650	1,747,097.913	39.814732522	-80.620090105
18,575.00	89.00	150.520	12,033.19	-5,731.30	1,912.23	14,459,415.781	1,747,144.072	39.814507154	-80.619926967
18,668.00	89.09	149.900	12,034.74	-5,812.00	1,958.43	14,459,335.082	1,747,190.269	39.814284999	-80.619763674
18,762.00	89.26	149.640	12,036.10	-5,893.21	2,005.75	14,459,253.874	1,747,237.591	39.814061431	-80.619596389
18,855.00	89.13	150.040	12,037.40	-5,973.61	2,052.47	14,459,173.472	1,747,284.311	39.813840084	-80.619431234
18,949.00	89.13	150.210	12,038.83	-6,055.11	2,099.28	14,459,091.973	1,747,331.128	39.813615722	-80.619265752
19,042.00	89.04	150.210	12,040.32	-6,135.81	2,145.48	14,459,011.273	1,747,377.326	39.813393563	-80.619102461
19,135.00	89.13	149.860	12,041.80	-6,216.37	2,191.93	14,458,930.715	1,747,423.771	39.813171789	-80.618938292
19,229.00	89.09	149.900	12,043.26	-6,297.67	2,239.09	14,458,849.417	1,747,470.935	39.812947976	-80.618771571
19,322.00	89.13	150.300	12,044.70	-6,378.28	2,285.45	14,458,768.806	1,747,517.289	39.812726057	-80.618607730
19,415.00	89.13	150.170	12,046.12	-6,459.00	2,331.61	14,458,688.085	1,747,563.453	39.812503839	-80.618444566
19,509.00	89.09	149.550	12,047.58	-6,540.28	2,378.80	14,458,606.804	1,747,610.646	39.812280071	-80.618277749
19,601.00	89.13	150.040	12,049.01	-6,619.78	2,425.08	14,458,527.305	1,747,656.924	39.812061206	-80.618114159
19,695.00	89.13	149.290	12,050.43	-6,700.90	2,472.55	14,458,446.185	1,747,704.394	39.811837876	-80.617946356
19,788.00	89.22	148.490	12,051.77	-6,780.52	2,520.60	14,458,366.569	1,747,752.440	39.811618671	-80.617776478
19,881.00	89.09	148.930	12,053.14	-6,859.98	2,568.89	14,458,287.105	1,747,800.736	39.811399878	-80.617605708
19,974.00	89.04	148.320	12,054.66	-6,939.37	2,617.31	14,458,207.715	1,747,849.148	39.811181287	-80.617434524
20,068.00	89.13	149.070	12,056.16	-7,019.67	2,666.14	14,458,127.411	1,747,897.983	39.810960181	-80.617261850
20,160.00	89.04	148.360	12,057.63	-7,098.29	2,713.91	14,458,048.799	1,747,945.752	39.810743733	-80.617092948
20,253.00	89.09	149.200	12,059.15	-7,177.81	2,762.11	14,457,969.278	1,747,993.949	39.810524786	-80.616922535
20,347.00	89.04	149.150	12,060.68	-7,258.52	2,810.27	14,457,888.568	1,748,042.110	39.810302571	-80.616752271
20,440.00	89.17	149.290	12,062.14	-7,338.41	2,857.85	14,457,808.678	1,748,089.696	39.810082616	-80.616584042
20,532.00	89.31	148.540	12,063.36	-7,417.19	2,905.35	14,457,729.897	1,748,137.192	39.809865706	-80.616416119
20,627.00	89.13	149.590	12,064.65	-7,498.67	2,954.18	14,457,648.419	1,748,186.023	39.809641376	-80.616243484
20,720.00	88.86	150.650	12,066.28	-7,579.29	3,000.50	14,457,567.796	1,748,232.346	39.809419419	-80.616079766
20,813.00	89.09	150.260	12,067.94	-7,660.18	3,046.36	14,457,486.902	1,748,278.198	39.809196727	-80.615917734
20,907.00	88.91	149.640	12,069.59	-7,741.54	3,093.42	14,457,405.550	1,748,325.261	39.808972760	-80.615751394
20,999.00	88.91	148.400	12,071.34	-7,820.40	3,140.77	14,457,326.690	1,748,372.608	39.808755635	-80.615584009
21,092.00	89.09	149.810	12,072.96	-7,900.19	3,188.51	14,457,246.900	1,748,420.351	39.808535951	-80.615415225
21,186.00	88.69	148.890	12,074.78	-7,981.04	3,236.42	14,457,166.048	1,748,468.262	39.808313349	-80.615245863
21,279.00	88.78	148.760	12,076.83	-8,060.59	3,284.55	14,457,086.498	1,748,516.392	39.808094317	-80.615075702
21,373.00	89.00	149.020	12,078.65	-8,141.06	3,333.11	14,457,006.033	1,748,564.951	39.807872768	-80.614904029
21,466.00	88.86	147.920	12,080.39	-8,220.31	3,381.73	14,456,926.778	1,748,613.575	39.807654542	-80.614732105
21,559.00	88.91	148.180	12,082.20	-8,299.21	3,430.94	14,456,847.881	1,748,662.780	39.807437293	-80.614558112
21,653.00	89.09	148.320	12,083.84	-8,379.13	3,480.40	14,456,767.961	1,748,712.236	39.807217228	-80.614383238
21,747.00	88.91	150.480	12,085.48	-8,460.02	3,528.24	14,456,687.068	1,748,760.076	39.806994513	-80.614214136
21,841.00	88.69	151.180	12,087.45	-8,542.08	3,574.04	14,456,605.008	1,748,805.881	39.806768616	-80.614052297
21,934.00	88.64	150.040	12,089.62	-8,623.09	3,619.67	14,456,524.001	1,748,851.508	39.806545611	-80.613891080
22,028.00	88.82	150.040	12,091.70	-8,704.51	3,666.60	14,456,442.582	1,748,898.439	39.806321461	-80.613725223
22,121.00	88.91	150.650	12,093.54	-8,785.31	3,712.60	14,456,361.780	1,748,944.444	39.806099014	-80.613562658
22,215.00	88.91	150.740	12,095.33	-8,867.27	3,758.61	14,456,279.824	1,748,990.445	39.805873400	-80.613400127
22,307.00	88.69	150.210	12,097.26	-8,947.30	3,803.93	14,456,199.789	1,749,035.772	39.805653068	-80.613239963
22,400.00	88.73	150.170	12,099.35	-9,027.97	3,850.15	14,456,119.116	1,749,081.993	39.805430972	-80.613076630
22,493.00	88.86	150.260	12,101.31	-9,108.67	3,896.34	14,456,038.419	1,749,128.180	39.805208814	-80.612913418
22,587.00	88.91	149.200	12,103.14	-9,189.84	3,943.71	14,455,957.252	1,749,175.554	39.804985348	-80.612745991
22,679.00	88.91	149.070	12,104.89	-9,268.79	3,990.90	14,455,878.296	1,749,222.743	39.804767955	-80.612579187
22,772.00	88.73	150.390	12,106.80	-9,349.10	4,037.77	14,455,797.994	1,749,269.611	39.804546872	-80.612413549
22,866.00	89.04	149.550	12,108.63	-9,430.46	4,084.80	14,455,716.829	1,749,316.644	39.804322865	-80.612247339
22,959.00	89.40	150.260	12,109.90	-9,510.92	4,131.43	14,455,636.174	1,749,363.272	39.804101363	-80.612082557
23,053.00	89.17	149.990	12,111.07	-9,592.42	4,178.25	14,455,554.672	1,749,410.091	39.803876983	-80.611917116
23,146.00	88.95	149.770	12,112.60	-9,672.85	4,224.91	14,455,474.240	1,749,456.753	39.803655544	-80.611752216
23,239.00	88.73	150.080	12,114.48	-9,753.31	4,271.51	14,455,393.778	1,749,503.349	39.803434020	-80.611587535
23,332.00	88.86	150.390	12,116.43	-9,834.03	4,317.67	14,455,313.066	1,749,549.508	39.803211816	-80.611424453
23,425.00	88.78	149.680	12,118.35	-9,914.58	4,364.11	14,455,232.515	1,749,595.948	39.802990051	-80.611260348



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Breckenridge S-19 HU (slot R)
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-19 HU (slot R)	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
23,518.00	88.82	150.170	12,120.30	-9,995.04	4,410.70	14,455,152.053	1,749,642.543	39.802768530	-80.611095692
23,612.00	88.69	150.560	12,122.34	-10,076.72	4,457.17	14,455,070.369	1,749,689.012	39.802543652	-80.610931503
23,705.00	88.73	149.290	12,124.43	-10,157.18	4,503.77	14,454,989.911	1,749,735.605	39.802322142	-80.610766858
23,747.00	88.82	148.930	12,125.33	-10,193.21	4,525.32	14,454,953.877	1,749,757.162	39.802222927	-80.610690662
Survey @ 23747.00 MD 12125.33 TVD									
23,773.00	88.82	148.930	12,125.87	-10,215.48	4,538.74	14,454,931.612	1,749,770.578	39.802161621	-80.610643242
Survey Proj. to 23773.00 MD 12125.87 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
184.50	184.50	-0.44	-0.50	MWD surveys
23,747.00	12,125.33	-10,193.21	4,525.32	Survey @ 23747.00 MD 12125.33 TVD
23,773.00	12,125.87	-10,215.48	4,538.74	Survey Proj. to 23773.00 MD 12125.87 TVD

Checked By: _____ Approved By: _____ Date: _____

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