



Well: Michter N-08HU (G)
 Site: Michter
 Project: Marshall County, West Virginia
 Design: rev7
 Rig: H&P 611

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	10138.00	25.36	87.830	9810.80	46.10	1710.92	0.00	0.000	-612.99	Survey @ 10138.00 MD 9810.80 TVD
2	10290.04	25.36	87.830	9948.19	48.56	1775.99	0.00	0.000	-635.65	KOP Begin 6°/100' build
3	10700.71	50.00	87.830	10270.71	57.99	2024.90	6.00	0.000	-722.31	Begin 8°/100' build
4	10705.41	50.38	87.830	10273.72	58.13	2028.51	8.00	0.000	-723.56	Begin 8°/100' build/turn
5	12149.29	91.00	324.818	10978.00	1019.05	2248.33	8.00	-111.719	79.79	Begin 91.00° lateral
6	23415.29	91.00	324.818	10781.75	10225.69	-4241.81	0.00	0.000	1070.58	PBHL/TD 23415.29 MD/10781.75 TVD

ANNOTATIONS SURVEYS ORIGINAL HOLE

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Annotation
186.00	0.21	236.360	186.00	-0.19	-0.28	-0.07	MWD surveys
6191.00	5.84	83.960	6177.86	-19.04	250.31	-113.50	Survey @ 6191.00 MD 6177.86 TVD
6289.00	5.84	83.960	6275.35	-17.99	260.23	-116.33	Survey projected to 6289.00 MD 6275.35 TVD

ANNOTATIONS SURVEYS SIDETRACK 01

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Annotation
3630.00	5.14	84.050	3627.47	-36.38	22.19	-42.10	Tie into original hole @ 3630 MD
23252.00	92.75	327.160	10766.85	10137.37	-4167.13	10960.39	Survey @ 23252.00 MD 10766.85 TVD
23311.00	92.75	327.160	10764.02	10186.89	-4199.09	11018.37	Survey projected to 23311.00 MD 10764.02 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=1128+25 @ 1153.00ft (H&P 611)

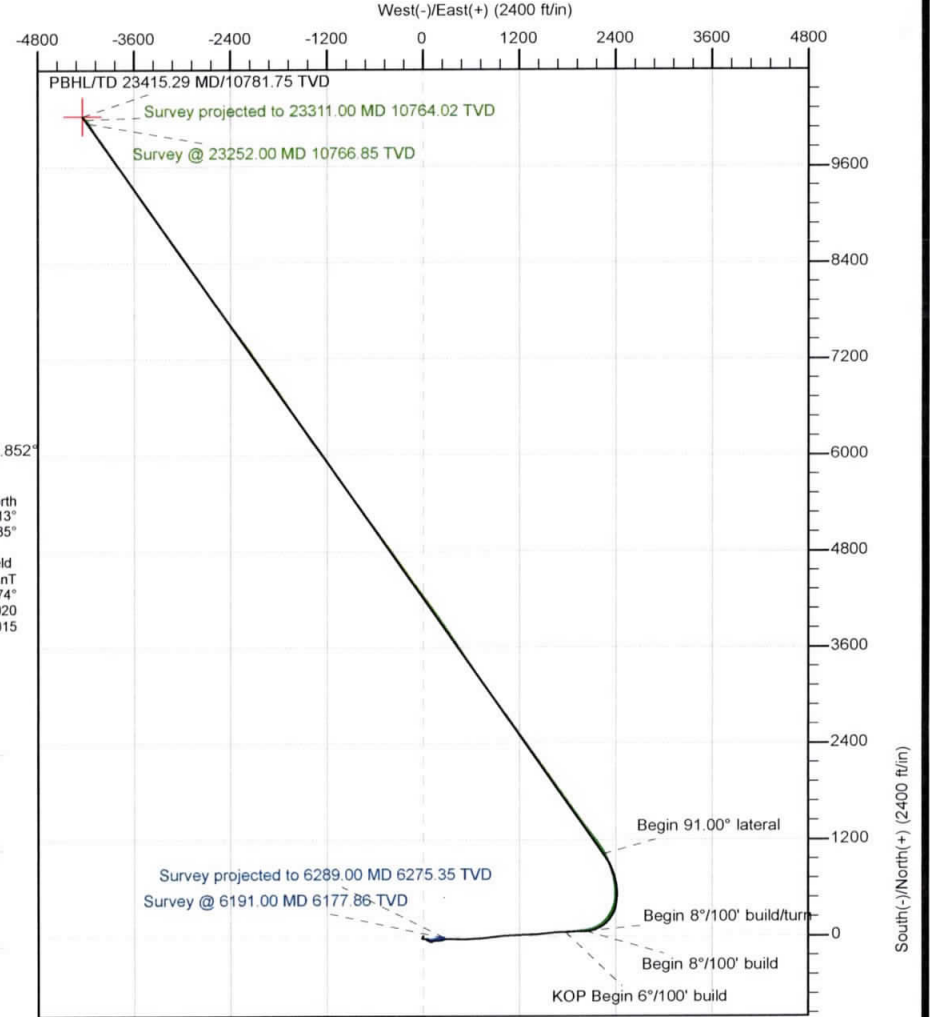
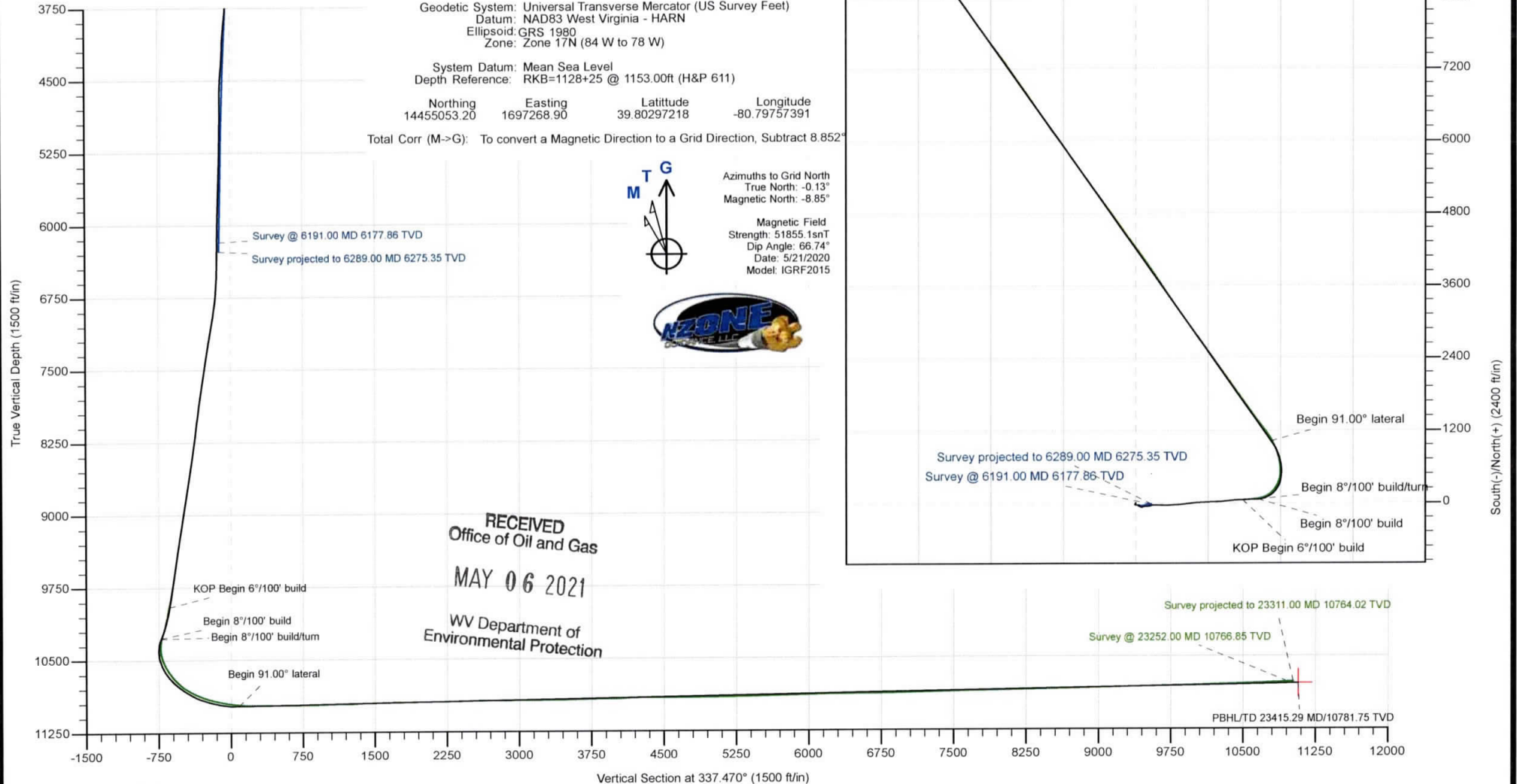
Northing	Easting	Latitude	Longitude
14455053.20	1697268.90	39.80297218	-80.79757391

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.852°



Azimuths to Grid North
 True North: -0.13°
 Magnetic North: -8.85°

Magnetic Field
 Strength: 51855.1snT
 Dip Angle: 66.74°
 Date: 5/21/2020
 Model: IGRF2015



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 MAY 06 2021
 WV Department of
 Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

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

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Site	Michter		
Site Position:		Northing:	14,454,962.42 usft
From:	Lat/Long	Easting:	1,697,325.45 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	39.80272253
		Longitude:	-80.79737330
		Grid Convergence:	0.130 °

Well	Michter N-08HU (G)		
Well Position	+N/-S 0.00 ft	Northing:	14,455,053.20 usft
	+E/-W 0.00 ft	Easting:	1,697,268.90 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39.80297218
		Longitude:	-80.79757391
		Ground Level:	1,128.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/1/2020	-8.715	66.755	51,880.59471721

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	337.470

Survey Program	Date 3/13/2020			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
186.00	788.00	MWD surf (Original Hole)	MWD	MWD - Standard
822.00	2,608.00	MWD int (Original Hole)	MWD	MWD - Standard
2,682.00	6,191.00	MWD (Original Hole)	MWD	MWD - Standard
6,251.00	6,289.00	Projection (Original Hole)	MWD	MWD - Standard

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186.00	0.21	236.360	186.00	-0.19	-0.28	-0.07	0.11	0.11	0.00
MWD surveys									
232.00	0.17	228.010	232.00	-0.28	-0.40	-0.10	0.11	-0.09	-18.15
322.00	0.13	288.130	322.00	-0.34	-0.60	-0.08	0.17	-0.04	66.80
367.00	0.04	81.500	367.00	-0.32	-0.63	-0.05	0.37	-0.20	340.82
413.00	0.13	296.570	413.00	-0.29	-0.66	-0.02	0.36	0.20	-315.07
458.00	0.13	298.150	458.00	-0.25	-0.76	0.06	0.01	0.00	3.51

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

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)
503.00	0.17	317.130	503.00	-0.17	-0.85	0.16	0.14	0.09	42.18
551.00	0.17	293.050	551.00	-0.09	-0.96	0.28	0.15	0.00	-50.17
598.00	0.22	304.480	598.00	-0.02	-1.10	0.41	0.13	0.11	24.32
623.00	0.22	318.100	623.00	0.05	-1.17	0.49	0.21	0.00	54.48
693.00	0.22	317.220	693.00	0.25	-1.35	0.74	0.00	0.00	-1.26
740.00	0.22	333.750	740.00	0.39	-1.45	0.92	0.13	0.00	35.17
788.00	0.08	293.930	788.00	0.49	-1.52	1.04	0.35	-0.29	-82.96
822.00	0.08	293.930	822.00	0.51	-1.57	1.07	0.00	0.00	0.00
1,063.00	0.44	143.290	1,062.99	-0.17	-1.17	0.29	0.21	0.15	-62.51
1,158.00	0.66	161.830	1,157.99	-0.98	-0.78	-0.60	0.30	0.23	19.52
1,253.00	0.84	173.260	1,252.98	-2.19	-0.53	-1.82	0.25	0.19	12.03
1,347.00	0.92	184.500	1,346.97	-3.63	-0.50	-3.16	0.20	0.09	11.96
1,442.00	0.87	179.410	1,441.96	-5.11	-0.56	-4.50	0.10	-0.05	-5.36
1,537.00	1.09	185.120	1,536.95	-6.73	-0.63	-5.97	0.25	0.23	6.01
1,632.00	1.27	202.610	1,631.93	-8.60	-1.12	-7.52	0.42	0.19	18.41
1,727.00	2.02	208.690	1,726.89	-11.04	-2.32	-9.31	0.81	0.79	6.40
1,821.00	3.25	207.620	1,820.79	-14.86	-4.36	-12.05	1.31	1.31	-1.14
1,916.00	3.29	199.800	1,915.63	-19.81	-6.53	-15.79	0.47	0.04	-8.23
2,011.00	3.30	186.800	2,010.48	-25.09	-7.77	-20.19	0.78	0.01	-13.68
2,106.00	3.39	177.040	2,105.31	-30.61	-7.95	-25.22	0.61	0.09	-10.27
2,200.00	1.06	132.300	2,199.24	-33.97	-7.17	-28.63	2.92	-2.48	-47.60
2,295.00	1.98	42.390	2,294.22	-33.35	-5.41	-28.73	2.36	0.97	-94.64
2,390.00	1.89	16.630	2,389.17	-30.63	-3.85	-26.82	0.91	-0.09	-27.12
2,484.00	1.09	337.610	2,483.13	-28.32	-3.75	-24.72	1.33	-0.85	-41.51
2,579.00	1.66	291.820	2,578.11	-26.97	-5.37	-22.86	1.25	0.60	-48.20
2,608.00	1.75	288.300	2,607.10	-26.68	-6.18	-22.27	0.48	0.31	-12.14
2,682.00	1.88	279.600	2,681.06	-26.12	-8.45	-20.89	0.41	0.18	-11.76
2,777.00	1.66	267.740	2,776.01	-25.92	-11.36	-19.58	0.45	-0.23	-12.48
2,872.00	1.01	250.160	2,870.99	-26.26	-13.53	-19.07	0.80	-0.68	-18.51
2,967.00	0.96	198.740	2,965.98	-27.29	-14.57	-19.63	0.90	-0.05	-54.13
3,061.00	1.09	155.680	3,059.96	-28.85	-14.46	-21.11	0.81	0.14	-45.81
3,156.00	1.76	125.800	3,154.93	-30.53	-12.90	-23.26	1.03	0.71	-31.45
3,251.00	3.21	110.160	3,249.84	-32.30	-9.22	-26.30	1.67	1.53	-16.46
3,346.00	4.40	103.740	3,344.63	-34.08	-3.18	-30.26	1.33	1.25	-6.76
3,440.00	5.31	99.520	3,438.29	-35.66	4.61	-34.70	1.04	0.97	-4.49
3,535.00	5.45	92.750	3,532.88	-36.60	13.45	-38.96	0.68	0.15	-7.13
3,630.00	5.14	84.050	3,627.47	-36.38	22.19	-42.10	0.90	-0.33	-9.16
3,725.00	5.10	79.920	3,722.09	-35.20	30.58	-44.23	0.39	-0.04	-4.35
3,819.00	4.48	86.510	3,815.77	-34.24	38.36	-46.33	0.88	-0.66	7.01
3,914.00	4.87	96.610	3,910.45	-34.48	46.07	-49.50	0.96	0.41	10.63
4,009.00	5.22	101.360	4,005.08	-35.80	54.31	-53.87	0.57	0.37	5.00
4,104.00	5.00	104.260	4,099.71	-37.67	62.56	-58.76	0.36	-0.23	3.05
4,198.00	4.61	105.050	4,193.38	-39.66	70.18	-63.52	0.42	-0.41	0.84

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

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)	
4,293.00	4.61	99.690	4,288.07	-41.29	77.63	-67.88	0.45	0.00	-5.64	
4,388.00	5.14	96.610	4,382.73	-42.42	85.62	-71.99	0.62	0.56	-3.24	
4,483.00	5.76	90.910	4,477.30	-42.99	94.61	-75.96	0.87	0.65	-6.00	
4,577.00	6.37	84.840	4,570.77	-42.60	104.52	-79.39	0.94	0.65	-6.46	
4,672.00	6.68	84.750	4,665.15	-41.62	115.27	-82.61	0.33	0.33	-0.09	
4,767.00	6.02	82.300	4,759.57	-40.44	125.71	-85.52	0.75	-0.69	-2.58	
4,861.00	5.80	79.130	4,853.07	-38.89	135.26	-87.75	0.42	-0.23	-3.37	
4,956.00	5.40	78.330	4,947.62	-37.08	144.35	-89.56	0.43	-0.42	-0.84	
5,051.00	5.50	79.830	5,042.19	-35.37	153.21	-91.38	0.18	0.11	1.58	
5,146.00	4.92	82.460	5,136.80	-34.03	161.73	-93.40	0.66	-0.61	2.77	
5,240.00	4.92	81.500	5,230.45	-32.91	169.71	-95.42	0.09	0.00	-1.02	
5,335.00	5.58	85.630	5,325.05	-31.95	178.35	-97.85	0.80	0.69	4.35	
5,430.00	4.92	83.430	5,419.65	-31.13	187.00	-100.41	0.73	-0.69	-2.32	
5,525.00	4.52	80.710	5,514.33	-30.06	194.74	-102.39	0.48	-0.42	-2.86	
5,619.00	5.84	82.730	5,607.94	-28.86	203.14	-104.49	1.42	1.40	2.15	
5,714.00	5.76	81.150	5,702.46	-27.52	212.65	-106.89	0.19	-0.08	-1.66	
5,809.00	4.83	76.230	5,797.05	-25.83	221.24	-108.63	1.09	-0.98	-5.18	
5,904.00	3.91	72.540	5,891.78	-23.91	228.22	-109.53	1.01	-0.97	-3.88	
6,002.00	4.09	70.780	5,989.54	-21.75	234.70	-110.02	0.22	0.18	-1.80	
6,097.00	4.75	81.850	6,084.26	-20.08	241.80	-111.20	1.13	0.69	11.65	
6,160.00	5.36	83.440	6,147.01	-19.37	247.30	-112.65	0.99	0.97	2.52	
6,191.00	5.84	83.960	6,177.86	-19.04	250.31	-113.50	1.56	1.55	1.68	
Survey @ 6191.00 MD 6177.86 TVD										
6,289.00	5.84	83.960	6,275.35	-17.99	260.23	-116.33	0.00	0.00	0.00	
Survey projected to 6289.00 MD 6275.35 TVD										

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
186.00	186.00	-0.19	-0.28	MWD surveys
6,191.00	6,177.86	-19.04	250.31	Survey @ 6191.00 MD 6177.86 TVD
6,289.00	6,275.35	-17.99	260.23	Survey projected to 6289.00 MD 6275.35 TVD

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

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

Site	Michter				
Site Position:		Northing:	14,454,962.42 usft	Latitude:	39.80272253
From:	Lat/Long	Easting:	1,697,325.45 usft	Longitude:	-80.79737330
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.130 °

Well	Michter N-08HU (G)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,053.20 usft	Latitude:	39.80297218
	+E/-W	0.00 ft	Easting:	1,697,268.90 usft	Longitude:	-80.79757391
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	1,128.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/1/2020	-8.715	66.755	51,880.59471721

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	337.470	

Survey Program	Date	3/13/2020			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
186.00	788.00	MWD surf (Original Hole)	MWD	MWD - Standard	
822.00	2,608.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,682.00	6,191.00	MWD (Original Hole)	MWD	MWD - Standard	
6,251.00	6,289.00	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	14,455,053.20	1,697,268.90	39.80297218	-80.79757391	
186.00	0.21	236.360	186.00	-0.19	-0.28	14,455,053.01	1,697,268.62	39.80297167	-80.79757492	
MWD surveys										
232.00	0.17	228.010	232.00	-0.28	-0.40	14,455,052.92	1,697,268.50	39.80297141	-80.79757535	
322.00	0.13	288.130	322.00	-0.34	-0.60	14,455,052.86	1,697,268.30	39.80297126	-80.79757605	
367.00	0.04	81.500	367.00	-0.32	-0.63	14,455,052.88	1,697,268.27	39.80297131	-80.79757617	
413.00	0.13	296.570	413.00	-0.29	-0.66	14,455,052.90	1,697,268.24	39.80297138	-80.79757628	
458.00	0.13	298.150	458.00	-0.25	-0.76	14,455,052.95	1,697,268.14	39.80297151	-80.79757660	
503.00	0.17	317.130	503.00	-0.17	-0.85	14,455,053.02	1,697,268.05	39.80297171	-80.79757692	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
551.00	0.17	293.050	551.00	-0.09	-0.96	14,455,053.10	1,697,267.94	39.80297193	-80.79757733
598.00	0.22	304.480	598.00	-0.02	-1.10	14,455,053.18	1,697,267.80	39.80297214	-80.79757782
623.00	0.22	318.100	623.00	0.05	-1.17	14,455,053.25	1,697,267.73	39.80297232	-80.79757808
693.00	0.22	317.220	693.00	0.25	-1.35	14,455,053.44	1,697,267.55	39.80297286	-80.79757872
740.00	0.22	333.750	740.00	0.39	-1.45	14,455,053.59	1,697,267.45	39.80297327	-80.79757908
788.00	0.08	293.930	788.00	0.49	-1.52	14,455,053.69	1,697,267.38	39.80297353	-80.79757933
822.00	0.08	293.930	822.00	0.51	-1.57	14,455,053.71	1,697,267.33	39.80297359	-80.79757949
1,063.00	0.44	143.290	1,062.99	-0.17	-1.17	14,455,053.03	1,697,267.73	39.80297173	-80.79757807
1,158.00	0.66	161.830	1,157.99	-0.98	-0.78	14,455,052.22	1,697,268.12	39.80296950	-80.79757669
1,253.00	0.84	173.260	1,252.98	-2.19	-0.53	14,455,051.01	1,697,268.37	39.80296617	-80.79757580
1,347.00	0.92	184.500	1,346.97	-3.63	-0.50	14,455,049.57	1,697,268.40	39.80296223	-80.79757574
1,442.00	0.87	179.410	1,441.96	-5.11	-0.56	14,455,048.09	1,697,268.34	39.80295816	-80.79757594
1,537.00	1.09	185.120	1,536.95	-6.73	-0.63	14,455,046.47	1,697,268.27	39.80295371	-80.79757621
1,632.00	1.27	202.610	1,631.93	-8.60	-1.12	14,455,044.60	1,697,267.78	39.80294857	-80.79757795
1,727.00	2.02	208.690	1,726.89	-11.04	-2.32	14,455,042.16	1,697,266.58	39.80294187	-80.79758228
1,821.00	3.25	207.620	1,820.79	-14.86	-4.36	14,455,038.34	1,697,264.54	39.80293141	-80.79758954
1,916.00	3.29	199.800	1,915.63	-19.81	-6.53	14,455,033.39	1,697,262.37	39.80291783	-80.79759731
2,011.00	3.30	186.800	2,010.48	-25.09	-7.77	14,455,028.11	1,697,261.13	39.80290334	-80.79760179
2,106.00	3.39	177.040	2,105.31	-30.61	-7.95	14,455,022.59	1,697,260.95	39.80288818	-80.79760247
2,200.00	1.06	132.300	2,199.24	-33.97	-7.17	14,455,019.23	1,697,261.73	39.80287894	-80.79759970
2,295.00	1.98	42.390	2,294.22	-33.35	-5.41	14,455,019.85	1,697,263.49	39.80288064	-80.79759344
2,390.00	1.89	16.630	2,389.17	-30.63	-3.85	14,455,022.57	1,697,265.05	39.80288808	-80.79758788
2,484.00	1.09	337.610	2,483.13	-28.32	-3.75	14,455,024.88	1,697,265.15	39.80289443	-80.79758750
2,579.00	1.66	291.820	2,578.11	-26.97	-5.37	14,455,026.22	1,697,263.53	39.80289813	-80.79759326
2,608.00	1.75	288.300	2,607.10	-26.68	-6.18	14,455,026.52	1,697,262.72	39.80289895	-80.79759614
2,682.00	1.88	279.600	2,681.06	-26.12	-8.45	14,455,027.08	1,697,260.45	39.80290049	-80.79760422
2,777.00	1.66	267.740	2,776.01	-25.92	-11.36	14,455,027.28	1,697,257.54	39.80290108	-80.79761458
2,872.00	1.01	250.160	2,870.99	-26.26	-13.53	14,455,026.94	1,697,255.37	39.80290016	-80.79762229
2,967.00	0.96	198.740	2,965.98	-27.29	-14.57	14,455,025.91	1,697,254.33	39.80289732	-80.79762601
3,061.00	1.09	155.680	3,059.96	-28.85	-14.46	14,455,024.35	1,697,254.44	39.80289303	-80.79762561
3,156.00	1.76	125.800	3,154.93	-30.53	-12.90	14,455,022.67	1,697,256.00	39.80288842	-80.79762009
3,251.00	3.21	110.160	3,249.84	-32.30	-9.22	14,455,020.90	1,697,259.68	39.80288353	-80.79760700
3,346.00	4.40	103.740	3,344.63	-34.08	-3.18	14,455,019.12	1,697,265.72	39.80287860	-80.79758552
3,440.00	5.31	99.520	3,438.29	-35.66	4.61	14,455,017.54	1,697,273.51	39.80287422	-80.79755779
3,535.00	5.45	92.750	3,532.88	-36.60	13.45	14,455,016.60	1,697,282.35	39.80287158	-80.79752631
3,630.00	5.14	84.050	3,627.47	-36.38	22.19	14,455,016.82	1,697,291.09	39.80287214	-80.79749519
3,725.00	5.10	79.920	3,722.09	-35.20	30.58	14,455,018.00	1,697,299.48	39.80287533	-80.79746531
3,819.00	4.48	86.510	3,815.77	-34.24	38.36	14,455,018.96	1,697,307.26	39.80287790	-80.79743761
3,914.00	4.87	96.610	3,910.45	-34.48	46.07	14,455,018.72	1,697,314.97	39.80287720	-80.79741016
4,009.00	5.22	101.360	4,005.08	-35.80	54.31	14,455,017.40	1,697,323.21	39.80287354	-80.79738083
4,104.00	5.00	104.260	4,099.71	-37.67	62.56	14,455,015.53	1,697,331.46	39.80286835	-80.79735147
4,198.00	4.61	105.050	4,193.38	-39.66	70.18	14,455,013.54	1,697,339.08	39.80286284	-80.79732436
4,293.00	4.61	99.690	4,288.07	-41.29	77.63	14,455,011.91	1,697,346.53	39.80285830	-80.79729785
4,388.00	5.14	96.610	4,382.73	-42.42	85.62	14,455,010.78	1,697,354.52	39.80285514	-80.79726941
4,483.00	5.76	90.910	4,477.30	-42.99	94.61	14,455,010.21	1,697,363.51	39.80285353	-80.79723739
4,577.00	6.37	84.840	4,570.77	-42.60	104.52	14,455,010.60	1,697,373.42	39.80285455	-80.79720210
4,672.00	6.68	84.750	4,665.15	-41.62	115.27	14,455,011.58	1,697,384.17	39.80285718	-80.79716381
4,767.00	6.02	82.300	4,759.57	-40.44	125.71	14,455,012.76	1,697,394.61	39.80286033	-80.79712663
4,861.00	5.80	79.130	4,853.07	-38.89	135.26	14,455,014.31	1,697,404.16	39.80286455	-80.79709262
4,956.00	5.40	78.330	4,947.62	-37.08	144.35	14,455,016.12	1,697,413.25	39.80286946	-80.79706024
5,051.00	5.50	79.830	5,042.19	-35.37	153.21	14,455,017.83	1,697,422.11	39.80287410	-80.79702868
5,146.00	4.92	82.460	5,136.80	-34.03	161.73	14,455,019.17	1,697,430.63	39.80287772	-80.79699833
5,240.00	4.92	81.500	5,230.45	-32.91	169.71	14,455,020.29	1,697,438.61	39.80288076	-80.79696990
5,335.00	5.58	85.630	5,325.05	-31.95	178.35	14,455,021.25	1,697,447.25	39.80288332	-80.79693915
5,430.00	4.92	83.430	5,419.65	-31.13	187.00	14,455,022.07	1,697,455.90	39.80288552	-80.79690834

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,525.00	4.52	80.710	5,514.33	-30.06	194.74	14,455,023.14	1,697,463.64	39.80288841	-80.79688076
5,619.00	5.84	82.730	5,607.94	-28.86	203.14	14,455,024.34	1,697,472.04	39.80289166	-80.79685085
5,714.00	5.76	81.150	5,702.46	-27.52	212.65	14,455,025.68	1,697,481.55	39.80289529	-80.79681700
5,809.00	4.83	76.230	5,797.05	-25.83	221.24	14,455,027.37	1,697,490.14	39.80289987	-80.79678638
5,904.00	3.91	72.540	5,891.78	-23.91	228.22	14,455,029.29	1,697,497.12	39.80290511	-80.79676153
6,002.00	4.09	70.780	5,989.54	-21.75	234.70	14,455,031.45	1,697,503.60	39.80291098	-80.79673841
6,097.00	4.75	81.850	6,084.26	-20.08	241.80	14,455,033.12	1,697,510.70	39.80291553	-80.79671315
6,160.00	5.36	83.440	6,147.01	-19.37	247.30	14,455,033.83	1,697,516.20	39.80291744	-80.79669354
6,191.00	5.84	83.960	6,177.86	-19.04	250.31	14,455,034.16	1,697,519.21	39.80291833	-80.79668283
Survey @ 6191.00 MD 6177.86 TVD									
6,289.00	5.84	83.960	6,275.35	-17.99	260.23	14,455,035.21	1,697,529.13	39.80292115	-80.79664751
Survey projected to 6289.00 MD 6275.35 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
186.00	186.00	-0.19	-0.28	MWD surveys
6,191.00	6,177.86	-19.04	250.31	Survey @ 6191.00 MD 6177.86 TVD
6,289.00	6,275.35	-17.99	260.23	Survey projected to 6289.00 MD 6275.35 TVD



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

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

Site	Michter				
Site Position:		Northing:	14,454,962.42 usft	Latitude:	39.80272253
From:	Lat/Long	Easting:	1,697,325.45 usft	Longitude:	-80.79737330
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.130 °

Well	Michter N-08HU (G)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,053.20 usft	Latitude:	39.80297218
	+E/-W	0.00 ft	Easting:	1,697,268.90 usft	Longitude:	-80.79757391
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,128.00 ft

Wellbore	Sidetrack 01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/21/2020	-8.722	66.736	51,855.09424022

Design	Surveys Sidetrack 01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	3,630.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	337.470	

Survey Program	Date	10/18/2020			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
186.00	788.00	MWD surf (Original Hole)	MWD	MWD - Standard	
822.00	2,608.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,682.00	3,630.00	MWD (Original Hole)	MWD	MWD - Standard	
3,726.00	10,138.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard	
10,203.00	23,252.00	MWD lat (Sidetrack 01)	MWD	MWD - Standard	
23,311.00	23,311.00	Projection (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	
186.00	0.21	236.360	186.00	-0.19	-0.28	-0.07	0.11	0.11	0.00	
232.00	0.17	228.010	232.00	-0.28	-0.40	-0.10	0.11	-0.09	-18.15	
322.00	0.13	288.130	322.00	-0.34	-0.60	-0.08	0.17	-0.04	66.80	
367.00	0.04	81.500	367.00	-0.32	-0.63	-0.05	0.37	-0.20	340.82	
413.00	0.13	296.570	413.00	-0.29	-0.66	-0.02	0.36	0.20	-315.07	

08/27/2021



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

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)
458.00	0.13	298.150	458.00	-0.25	-0.76	0.06	0.01	0.00	3.51
503.00	0.17	317.130	503.00	-0.17	-0.85	0.16	0.14	0.09	42.18
551.00	0.17	293.050	551.00	-0.09	-0.96	0.28	0.15	0.00	-50.17
598.00	0.22	304.480	598.00	-0.02	-1.10	0.41	0.13	0.11	24.32
623.00	0.22	318.100	623.00	0.05	-1.17	0.49	0.21	0.00	54.48
693.00	0.22	317.220	693.00	0.25	-1.35	0.74	0.00	0.00	-1.26
740.00	0.22	333.750	740.00	0.39	-1.45	0.92	0.13	0.00	35.17
788.00	0.08	293.930	788.00	0.49	-1.52	1.04	0.35	-0.29	-82.96
822.00	0.08	293.930	822.00	0.51	-1.57	1.07	0.00	0.00	0.00
1,063.00	0.44	143.290	1,062.99	-0.17	-1.17	0.29	0.21	0.15	-62.51
1,158.00	0.66	161.830	1,157.99	-0.98	-0.78	-0.60	0.30	0.23	19.52
1,253.00	0.84	173.260	1,252.98	-2.19	-0.53	-1.82	0.25	0.19	12.03
1,347.00	0.92	184.500	1,346.97	-3.63	-0.50	-3.16	0.20	0.09	11.96
1,442.00	0.87	179.410	1,441.96	-5.11	-0.56	-4.50	0.10	-0.05	-5.36
1,537.00	1.09	185.120	1,536.95	-6.73	-0.63	-5.97	0.25	0.23	6.01
1,632.00	1.27	202.610	1,631.93	-8.60	-1.12	-7.52	0.42	0.19	18.41
1,727.00	2.02	208.690	1,726.89	-11.04	-2.32	-9.31	0.81	0.79	6.40
1,821.00	3.25	207.620	1,820.79	-14.86	-4.36	-12.05	1.31	1.31	-1.14
1,916.00	3.29	199.800	1,915.63	-19.81	-6.53	-15.79	0.47	0.04	-8.23
2,011.00	3.30	186.800	2,010.48	-25.09	-7.77	-20.19	0.78	0.01	-13.68
2,106.00	3.39	177.040	2,105.31	-30.61	-7.95	-25.22	0.61	0.09	-10.27
2,200.00	1.06	132.300	2,199.24	-33.97	-7.17	-28.63	2.92	-2.48	-47.60
2,295.00	1.98	42.390	2,294.22	-33.35	-5.41	-28.73	2.36	0.97	-94.64
2,390.00	1.89	16.630	2,389.17	-30.63	-3.85	-26.82	0.91	-0.09	-27.12
2,484.00	1.09	337.610	2,483.13	-28.32	-3.75	-24.72	1.33	-0.85	-41.51
2,579.00	1.66	291.820	2,578.11	-26.97	-5.37	-22.86	1.25	0.60	-48.20
2,608.00	1.75	288.300	2,607.10	-26.68	-6.18	-22.27	0.48	0.31	-12.14
2,682.00	1.88	279.600	2,681.06	-26.12	-8.45	-20.89	0.41	0.18	-11.76
2,777.00	1.66	267.740	2,776.01	-25.92	-11.36	-19.58	0.45	-0.23	-12.48
2,872.00	1.01	250.160	2,870.99	-26.26	-13.53	-19.07	0.80	-0.68	-18.51
2,967.00	0.96	198.740	2,965.98	-27.29	-14.57	-19.63	0.90	-0.05	-54.13
3,061.00	1.09	155.680	3,059.96	-28.85	-14.46	-21.11	0.81	0.14	-45.81
3,156.00	1.76	125.800	3,154.93	-30.53	-12.90	-23.26	1.03	0.71	-31.45
3,251.00	3.21	110.160	3,249.84	-32.30	-9.22	-26.30	1.67	1.53	-16.46
3,346.00	4.40	103.740	3,344.63	-34.08	-3.18	-30.26	1.33	1.25	-6.76
3,440.00	5.31	99.520	3,438.29	-35.66	4.61	-34.70	1.04	0.97	-4.49
3,535.00	5.45	92.750	3,532.88	-36.60	13.45	-38.96	0.68	0.15	-7.13
3,630.00	5.14	84.050	3,627.47	-36.38	22.19	-42.10	0.90	-0.33	-9.16
Tie into original hole @ 3630 MD									
3,726.00	4.26	100.490	3,723.15	-36.58	29.97	-45.27	1.67	-0.92	17.13
3,771.00	5.10	120.090	3,768.01	-37.89	33.35	-47.77	3.99	1.87	43.56
3,821.00	6.15	125.800	3,817.77	-40.57	37.44	-51.82	2.38	2.10	11.42
3,916.00	6.77	127.110	3,912.16	-46.92	46.04	-60.98	0.67	0.65	1.38
4,010.00	6.33	118.150	4,005.55	-52.71	55.02	-69.77	1.18	-0.47	-9.53

08/27/2021

Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia
Site: Michter
Well: Michter N-08HU (G)
Wellbore: Sidetrack 01
Design: Surveys Sidetrack 01

Local Co-ordinate Reference: Well Michter N-08HU (G)
TVD Reference: RKB=1128+25 @ 1153.00ft (H&P 611)
MD Reference: RKB=1128+25 @ 1153.00ft (H&P 611)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug1919_v14

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)
4,105.00	4.22	98.550	4,100.15	-55.70	63.10	-75.63	2.89	-2.22	-20.63
4,200.00	3.25	112.180	4,194.95	-57.24	69.05	-79.33	1.38	-1.02	14.35
4,295.00	4.79	123.600	4,289.71	-60.45	74.85	-84.52	1.82	1.62	12.02
4,389.00	6.37	122.720	4,383.27	-65.44	82.50	-92.06	1.68	1.68	-0.94
4,484.00	6.99	102.510	4,477.63	-69.54	92.58	-99.71	2.54	0.65	-21.27
4,579.00	6.86	79.920	4,571.96	-69.80	103.81	-104.25	2.85	-0.14	-23.78
4,674.00	5.10	62.080	4,666.44	-66.83	113.13	-105.08	2.67	-1.85	-18.78
4,768.00	4.26	62.870	4,760.13	-63.28	119.93	-104.41	0.90	-0.89	0.84
4,863.00	3.87	78.600	4,854.89	-61.04	126.22	-104.74	1.24	-0.41	16.56
4,958.00	4.61	73.860	4,949.63	-59.35	133.03	-105.79	0.86	0.78	-4.99
5,052.00	4.75	76.140	5,043.32	-57.36	140.43	-106.79	0.25	0.15	2.43
5,147.00	4.79	73.150	5,137.99	-55.27	148.05	-107.78	0.27	0.04	-3.15
5,242.00	4.35	88.710	5,232.69	-54.04	155.45	-109.48	1.38	-0.46	16.38
5,337.00	4.57	82.470	5,327.41	-53.46	162.80	-111.76	0.56	0.23	-6.57
5,443.00	4.75	94.600	5,433.06	-53.26	171.36	-114.86	0.94	0.17	11.44
5,526.00	5.19	92.050	5,515.75	-53.67	178.54	-117.99	0.59	0.53	-3.07
5,621.00	4.97	89.500	5,610.37	-53.79	186.95	-121.32	0.33	-0.23	-2.68
5,716.00	5.93	89.680	5,704.94	-53.73	195.97	-124.72	1.01	1.01	0.19
5,811.00	5.58	87.040	5,799.46	-53.46	205.49	-128.12	0.46	-0.37	-2.78
5,905.00	5.05	78.070	5,893.06	-52.37	214.10	-130.41	1.05	-0.56	-9.54
6,000.00	5.19	76.930	5,987.68	-50.53	222.38	-131.88	0.18	0.15	-1.20
6,095.00	5.45	78.690	6,082.27	-48.68	230.99	-133.47	0.32	0.27	1.85
6,158.00	5.71	78.950	6,144.97	-47.49	237.00	-134.67	0.41	0.41	0.41
6,287.00	4.79	74.560	6,273.43	-44.83	248.49	-136.62	0.78	-0.71	-3.40
6,382.00	4.88	75.350	6,368.09	-42.75	256.22	-137.66	0.12	0.09	0.83
6,476.00	5.80	79.390	6,461.69	-40.86	264.76	-139.19	1.06	0.98	4.30
6,571.00	7.69	81.680	6,556.02	-39.06	275.77	-141.74	2.01	1.99	2.41
6,666.00	10.42	85.630	6,649.83	-37.48	290.62	-145.98	2.95	2.87	4.16
6,761.00	12.79	89.850	6,742.88	-36.80	309.71	-152.66	2.65	2.49	4.44
6,855.00	17.67	92.930	6,833.56	-37.50	334.38	-162.76	5.26	5.19	3.28
6,949.00	21.05	92.490	6,922.23	-38.97	365.50	-176.04	3.60	3.60	-0.47
7,045.00	24.30	91.300	7,010.80	-40.16	402.48	-191.32	3.42	3.39	-1.24
7,139.00	23.33	91.080	7,096.79	-40.95	440.43	-206.59	1.04	-1.03	-0.23
7,233.00	22.37	89.850	7,183.42	-41.26	476.93	-220.85	1.14	-1.02	-1.31
7,328.00	23.25	88.530	7,270.99	-40.73	513.75	-234.47	1.07	0.93	-1.39
7,423.00	23.16	88.970	7,358.30	-39.91	551.17	-248.06	0.21	-0.09	0.46
7,518.00	23.91	87.740	7,445.40	-38.82	589.09	-261.57	0.94	0.79	-1.29
7,613.00	25.53	87.210	7,531.69	-37.06	628.77	-275.16	1.72	1.71	-0.56
7,707.00	27.03	84.840	7,615.97	-34.15	670.28	-288.38	1.95	1.60	-2.52
7,802.00	26.85	85.190	7,700.66	-30.41	713.16	-301.35	0.25	-0.19	0.37
7,897.00	27.20	83.350	7,785.29	-26.10	756.11	-313.82	0.95	0.37	-1.94
7,992.00	27.38	83.080	7,869.72	-20.95	799.36	-325.64	0.23	0.19	-0.28
8,086.00	26.94	83.350	7,953.35	-15.88	841.97	-337.29	0.49	-0.47	0.29

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

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)
8,181.00	25.27	83.170	8,038.66	-10.98	883.48	-348.66	1.76	-1.76	-0.19
8,276.00	23.86	81.590	8,125.06	-5.76	922.62	-358.84	1.64	-1.48	-1.66
8,370.00	23.33	83.520	8,211.20	-0.88	959.92	-368.62	1.00	-0.56	2.05
8,465.00	23.60	85.900	8,298.35	2.61	997.58	-379.83	1.04	0.28	2.51
8,560.00	23.51	87.040	8,385.43	4.94	1,035.47	-392.19	0.49	-0.09	1.20
8,654.00	24.17	87.480	8,471.41	6.76	1,073.42	-405.06	0.73	0.70	0.47
8,749.00	25.44	87.040	8,557.65	8.67	1,113.23	-418.55	1.35	1.34	-0.46
8,844.00	25.75	86.690	8,643.32	10.91	1,154.21	-432.18	0.36	0.33	-0.37
8,939.00	24.48	88.530	8,729.34	12.61	1,194.49	-446.04	1.57	-1.34	1.94
9,034.00	25.09	88.090	8,815.59	13.78	1,234.30	-460.21	0.67	0.64	-0.46
9,127.00	25.05	87.570	8,899.83	15.28	1,273.68	-473.92	0.24	-0.04	-0.56
9,222.00	24.87	88.530	8,985.96	16.64	1,313.74	-488.01	0.47	-0.19	1.01
9,317.00	25.75	86.860	9,071.84	18.28	1,354.32	-502.04	1.19	0.93	-1.76
9,411.00	25.75	85.630	9,156.50	20.96	1,395.06	-515.18	0.57	0.00	-1.31
9,506.00	25.58	85.630	9,242.13	24.09	1,436.09	-528.01	0.18	-0.18	0.00
9,601.00	25.75	86.160	9,327.76	27.04	1,477.13	-541.01	0.30	0.18	0.56
9,696.00	26.06	84.580	9,413.21	30.39	1,518.49	-553.76	0.80	0.33	-1.66
9,791.00	26.24	84.140	9,498.49	34.51	1,560.16	-565.93	0.28	0.19	-0.46
9,885.00	25.97	84.750	9,582.90	38.51	1,601.33	-578.00	0.41	-0.29	0.65
9,980.00	25.88	85.720	9,668.34	41.96	1,642.72	-590.67	0.46	-0.09	1.02
10,075.00	25.58	86.510	9,753.92	44.76	1,683.86	-603.86	0.48	-0.32	0.83
10,138.00	25.36	87.830	9,810.80	46.10	1,710.92	-612.99	0.97	-0.35	2.10
10,207.00	26.29	90.820	9,872.91	46.44	1,740.97	-624.19	2.32	1.35	4.33
10,254.00	27.87	90.990	9,914.76	46.10	1,762.36	-632.70	3.37	3.36	0.36
10,302.00	29.80	89.850	9,956.80	45.94	1,785.51	-641.72	4.18	4.02	-2.38
10,349.00	31.08	87.040	9,997.33	46.59	1,809.30	-650.23	4.07	2.72	-5.98
10,397.00	35.03	83.080	10,037.56	48.89	1,835.37	-658.09	9.38	8.23	-8.25
10,444.00	37.80	84.230	10,075.37	51.97	1,863.09	-665.87	6.07	5.89	2.45
10,491.00	37.80	83.870	10,112.51	54.95	1,891.74	-674.09	0.47	0.00	-0.77
10,538.00	39.82	84.140	10,149.13	58.03	1,921.04	-682.48	4.31	4.30	0.57
10,586.00	41.89	84.310	10,185.44	61.19	1,952.28	-691.53	4.32	4.31	0.35
10,633.00	43.65	86.600	10,219.94	63.71	1,984.09	-701.39	5.00	3.74	4.87
10,681.00	44.13	85.900	10,254.53	65.88	2,017.29	-712.11	1.42	1.00	-1.46
10,728.00	44.92	79.480	10,288.06	70.08	2,049.94	-720.74	9.72	1.68	-13.66
10,775.00	45.49	75.880	10,321.18	77.20	2,082.52	-726.64	5.57	1.21	-7.66
10,822.00	46.37	71.660	10,353.88	86.65	2,114.92	-730.34	6.72	1.87	-8.98
10,870.00	47.12	64.100	10,386.79	99.81	2,147.26	-730.57	11.57	1.56	-15.75
10,917.00	47.38	59.000	10,418.71	116.24	2,177.58	-727.01	7.99	0.55	-10.85
10,965.00	46.73	54.170	10,451.42	135.57	2,206.90	-720.39	7.49	-1.35	-10.06
11,012.00	46.46	49.600	10,483.73	156.63	2,233.75	-711.22	7.09	-0.57	-9.72
11,060.00	46.90	46.520	10,516.66	179.97	2,259.72	-699.61	4.76	0.92	-6.42
11,107.00	47.08	42.130	10,548.73	204.55	2,283.72	-686.11	6.84	0.38	-9.34
11,154.00	47.47	36.500	10,580.63	231.24	2,305.58	-669.83	8.84	0.83	-11.98

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

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)
11,201.00	48.35	31.670	10,612.15	260.12	2,325.10	-650.64	7.85	1.87	-10.28
11,249.00	49.10	26.220	10,643.82	291.67	2,342.54	-628.18	8.67	1.56	-11.35
11,296.00	49.32	23.850	10,674.53	323.91	2,357.60	-604.17	3.85	0.47	-5.04
11,344.00	50.59	20.240	10,705.42	357.96	2,371.37	-577.99	6.34	2.65	-7.52
11,391.00	52.40	15.320	10,734.69	392.97	2,382.58	-549.95	9.05	3.85	-10.47
11,438.00	55.25	10.050	10,762.44	429.96	2,390.87	-518.96	10.89	6.06	-11.21
11,485.00	58.59	5.210	10,788.10	468.97	2,396.07	-484.91	11.18	7.11	-10.30
11,533.00	60.84	1.260	10,812.31	510.34	2,398.39	-447.59	8.51	4.69	-8.23
11,580.00	63.91	358.010	10,834.11	551.97	2,398.11	-409.03	8.95	6.53	-6.91
11,627.00	66.02	355.460	10,854.00	594.48	2,395.67	-368.84	6.66	4.49	-5.43
11,674.00	67.74	351.590	10,872.46	637.42	2,390.79	-327.31	8.41	3.66	-8.23
11,722.00	70.15	348.600	10,889.71	681.53	2,383.08	-283.60	7.68	5.02	-6.23
11,769.00	72.97	346.580	10,904.57	725.07	2,373.49	-239.71	7.25	6.00	-4.30
11,817.00	75.12	344.210	10,917.77	769.72	2,361.85	-194.01	6.53	4.48	-4.94
11,864.00	77.27	342.800	10,928.98	813.48	2,348.89	-148.62	5.42	4.57	-3.00
11,911.00	79.25	341.220	10,938.55	857.24	2,334.68	-102.75	5.35	4.21	-3.36
11,958.00	80.88	339.020	10,946.66	900.77	2,318.93	-56.51	5.77	3.47	-4.68
12,006.00	82.11	336.300	10,953.76	944.68	2,300.89	-9.05	6.16	2.56	-5.67
12,053.00	83.03	333.660	10,959.83	986.90	2,281.18	37.51	5.90	1.96	-5.62
12,100.00	84.84	331.200	10,964.80	1,028.33	2,259.55	84.06	6.47	3.85	-5.23
12,147.00	86.46	328.390	10,968.37	1,068.82	2,235.98	130.50	6.89	3.45	-5.98
12,195.00	87.91	325.570	10,970.72	1,109.02	2,209.85	177.63	6.60	3.02	-5.88
12,242.00	90.24	322.850	10,971.48	1,147.13	2,182.37	223.37	7.62	4.96	-5.79
12,290.00	90.73	322.760	10,971.08	1,185.37	2,153.36	269.80	1.04	1.02	-0.19
12,384.00	91.25	323.200	10,969.45	1,260.41	2,096.77	360.80	0.72	0.55	0.47
12,479.00	89.71	322.670	10,968.66	1,336.21	2,039.52	452.75	1.71	-1.62	-0.56
12,574.00	89.63	322.670	10,969.20	1,411.74	1,981.91	544.60	0.08	-0.08	0.00
12,669.00	89.85	323.730	10,969.64	1,487.81	1,925.00	636.66	1.14	0.23	1.12
12,764.00	90.07	325.050	10,969.70	1,565.05	1,869.69	729.20	1.41	0.23	1.39
12,858.00	91.03	325.050	10,968.80	1,642.09	1,815.84	820.99	1.02	1.02	0.00
12,953.00	91.38	325.220	10,966.80	1,720.02	1,761.55	913.78	0.41	0.37	0.18
13,048.00	91.21	324.430	10,964.65	1,797.65	1,706.84	1,006.45	0.85	-0.18	-0.83
13,142.00	90.68	324.260	10,963.10	1,874.02	1,652.05	1,097.98	0.59	-0.56	-0.18
13,237.00	91.74	325.400	10,961.10	1,951.66	1,597.34	1,190.65	1.64	1.12	1.20
13,332.00	92.13	324.960	10,957.89	2,029.60	1,543.13	1,283.42	0.62	0.41	-0.46
13,427.00	91.78	325.570	10,954.65	2,107.63	1,489.03	1,376.22	0.74	-0.37	0.64
13,521.00	92.18	325.130	10,951.40	2,184.91	1,435.62	1,468.07	0.63	0.43	-0.47
13,616.00	91.08	324.520	10,948.70	2,262.53	1,380.92	1,560.73	1.32	-1.16	-0.64
13,711.00	90.51	324.520	10,947.38	2,339.88	1,325.78	1,653.30	0.60	-0.60	0.00
13,806.00	90.55	325.050	10,946.50	2,417.49	1,271.00	1,745.98	0.56	0.04	0.56
13,901.00	90.64	323.730	10,945.52	2,494.72	1,215.69	1,838.51	1.39	0.09	-1.39
13,995.00	90.59	324.780	10,944.51	2,571.01	1,160.78	1,930.01	1.12	-0.05	1.12
14,090.00	90.64	324.170	10,943.49	2,648.32	1,105.59	2,022.57	0.64	0.05	-0.64
14,185.00	90.86	324.170	10,942.24	2,725.33	1,049.98	2,115.02	0.23	0.23	0.00

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

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)
14,280.00	90.33	323.290	10,941.26	2,801.92	993.78	2,207.29	1.08	-0.56	-0.93
14,374.00	90.33	324.170	10,940.72	2,877.71	938.17	2,298.60	0.94	0.00	0.94
14,469.00	91.34	324.610	10,939.33	2,954.93	882.86	2,391.12	1.16	1.06	0.46
14,564.00	91.69	324.960	10,936.82	3,032.52	828.10	2,483.77	0.52	0.37	0.37
14,658.00	91.91	325.050	10,933.87	3,109.49	774.22	2,575.51	0.25	0.23	0.10
14,753.00	90.73	325.490	10,931.68	3,187.54	720.11	2,668.34	1.33	-1.24	0.46
14,848.00	90.29	324.960	10,930.83	3,265.57	665.93	2,761.17	0.73	-0.46	-0.56
14,942.00	90.46	326.010	10,930.22	3,343.02	612.67	2,853.12	1.13	0.18	1.12
15,037.00	90.86	326.980	10,929.12	3,422.23	560.23	2,946.38	1.10	0.42	1.02
15,132.00	90.20	326.280	10,928.24	3,501.56	507.98	3,039.68	1.01	-0.69	-0.74
15,227.00	90.42	325.660	10,927.73	3,580.29	454.82	3,132.77	0.69	0.23	-0.65
15,322.00	90.64	325.570	10,926.85	3,658.69	401.17	3,225.74	0.25	0.23	-0.09
15,416.00	90.02	325.050	10,926.31	3,735.98	347.67	3,317.63	0.86	-0.66	-0.55
15,511.00	90.64	325.570	10,925.76	3,814.09	293.61	3,410.49	0.85	0.65	0.55
15,605.00	91.74	324.870	10,923.81	3,891.28	240.00	3,502.33	1.39	1.17	-0.74
15,699.00	91.21	325.310	10,921.39	3,968.33	186.22	3,594.11	0.73	-0.56	0.47
15,794.00	91.21	325.660	10,919.39	4,046.59	132.41	3,687.02	0.37	0.00	0.37
15,888.00	90.29	324.430	10,918.15	4,123.63	78.56	3,778.81	1.63	-0.98	-1.31
15,983.00	91.52	324.170	10,916.65	4,200.77	23.13	3,871.30	1.32	1.29	-0.27
16,077.00	90.68	323.640	10,914.85	4,276.71	-32.24	3,962.66	1.06	-0.89	-0.56
16,172.00	92.09	324.430	10,912.55	4,353.57	-88.01	4,055.03	1.70	1.48	0.83
16,267.00	91.87	324.260	10,909.27	4,430.72	-143.36	4,147.49	0.29	-0.23	-0.18
16,361.00	91.91	324.170	10,906.17	4,506.93	-198.29	4,238.94	0.10	0.04	-0.10
16,456.00	90.02	323.550	10,904.57	4,583.63	-254.31	4,331.25	2.09	-1.99	-0.65
16,551.00	90.68	325.220	10,903.99	4,660.86	-309.63	4,423.78	1.89	0.69	1.76
16,645.00	89.41	324.430	10,903.92	4,737.69	-363.78	4,515.50	1.59	-1.35	-0.84
16,740.00	89.49	324.080	10,904.83	4,814.79	-419.27	4,607.98	0.38	0.08	-0.37
16,835.00	89.10	324.260	10,906.00	4,891.81	-474.88	4,700.42	0.45	-0.41	0.19
16,929.00	90.46	324.780	10,906.36	4,968.35	-529.44	4,792.03	1.55	1.45	0.55
17,024.00	89.80	324.080	10,906.14	5,045.63	-584.70	4,884.58	1.01	-0.69	-0.74
17,119.00	91.21	324.870	10,905.31	5,122.94	-639.89	4,977.14	1.70	1.48	0.83
17,214.00	91.12	325.050	10,903.37	5,200.70	-694.43	5,069.86	0.21	-0.09	0.19
17,308.00	90.42	324.260	10,902.11	5,277.37	-748.80	5,161.51	1.12	-0.74	-0.84
17,403.00	91.87	324.960	10,900.21	5,354.80	-803.81	5,254.11	1.69	1.53	0.74
17,498.00	91.74	324.780	10,897.22	5,432.45	-858.44	5,346.77	0.23	-0.14	-0.19
17,592.00	91.08	324.780	10,894.91	5,509.22	-912.64	5,438.45	0.70	-0.70	0.00
17,687.00	90.81	324.520	10,893.34	5,586.70	-967.60	5,531.07	0.39	-0.28	-0.27
17,782.00	90.55	323.990	10,892.21	5,663.80	-1,023.09	5,623.54	0.62	-0.27	-0.56
17,877.00	90.24	323.900	10,891.56	5,740.60	-1,079.00	5,715.91	0.34	-0.33	-0.09
17,971.00	92.04	324.690	10,889.69	5,816.91	-1,133.85	5,807.41	2.09	1.91	0.84
18,066.00	92.22	324.430	10,886.16	5,894.25	-1,188.89	5,899.94	0.33	0.19	-0.27
18,161.00	91.60	324.170	10,882.99	5,971.36	-1,244.30	5,992.39	0.71	-0.65	-0.27
18,256.00	91.56	324.340	10,880.37	6,048.43	-1,299.78	6,084.84	0.18	-0.04	0.18

Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia
Site: Michter
Well: Michter N-08HU (G)
Wellbore: Sidetrack 01
Design: Surveys Sidetrack 01

Local Co-ordinate Reference: Well Michter N-08HU (G)
TVD Reference: RKB=1128+25 @ 1153.00ft (H&P 611)
MD Reference: RKB=1128+25 @ 1153.00ft (H&P 611)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug1919_v14

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)
18,350.00	91.03	323.820	10,878.25	6,124.54	-1,354.91	6,176.26	0.79	-0.56	-0.55
18,445.00	90.46	325.930	10,877.01	6,202.23	-1,409.56	6,268.96	2.30	-0.60	2.22
18,540.00	90.11	325.840	10,876.54	6,280.88	-1,462.84	6,362.03	0.38	-0.37	-0.09
18,634.00	90.29	325.660	10,876.21	6,358.58	-1,515.74	6,454.07	0.27	0.19	-0.19
18,729.00	90.64	325.930	10,875.44	6,437.14	-1,569.14	6,547.10	0.47	0.37	0.28
18,824.00	90.81	325.930	10,874.24	6,515.83	-1,622.36	6,640.17	0.18	0.18	0.00
18,918.00	90.64	325.840	10,873.05	6,593.65	-1,675.08	6,732.25	0.20	-0.18	-0.10
19,013.00	90.68	325.310	10,871.95	6,672.00	-1,728.78	6,825.20	0.56	0.04	-0.56
19,108.00	91.47	325.400	10,870.17	6,750.15	-1,782.77	6,918.07	0.84	0.83	0.09
19,203.00	91.21	325.220	10,867.95	6,828.24	-1,836.83	7,010.91	0.33	-0.27	-0.19
19,297.00	91.25	325.130	10,865.93	6,905.38	-1,890.50	7,102.73	0.10	0.04	-0.10
19,392.00	91.65	325.130	10,863.53	6,983.30	-1,944.79	7,195.51	0.42	0.42	0.00
19,517.00	91.82	324.780	10,859.74	7,065.59	-2,016.54	7,317.48	0.31	0.14	-0.28
19,581.00	91.60	324.780	10,857.83	7,137.85	-2,053.43	7,379.89	0.34	-0.34	0.00
19,676.00	91.82	324.960	10,855.00	7,215.51	-2,108.07	7,472.56	0.30	0.23	0.19
19,771.00	91.52	324.610	10,852.23	7,293.10	-2,162.83	7,565.20	0.49	-0.32	-0.37
19,865.00	91.43	323.730	10,849.81	7,369.28	-2,217.84	7,656.65	0.94	-0.10	-0.94
19,960.00	91.16	323.640	10,847.66	7,445.81	-2,274.08	7,748.89	0.30	-0.28	-0.09
20,055.00	90.99	323.550	10,845.88	7,522.26	-2,330.46	7,841.10	0.20	-0.18	-0.09
20,150.00	90.59	323.550	10,844.57	7,598.66	-2,386.89	7,933.31	0.42	-0.42	0.00
20,244.00	91.08	324.340	10,843.20	7,674.65	-2,442.21	8,024.69	0.99	0.52	0.84
20,339.00	91.30	324.780	10,841.23	7,752.03	-2,497.28	8,117.27	0.52	0.23	0.46
20,434.00	91.12	324.780	10,839.22	7,829.62	-2,552.06	8,209.93	0.19	-0.19	0.00
20,529.00	91.34	324.780	10,837.18	7,907.22	-2,606.83	8,302.58	0.23	0.23	0.00
20,623.00	91.25	325.750	10,835.06	7,984.44	-2,660.38	8,394.43	1.04	-0.10	1.03
20,718.00	90.37	325.130	10,833.72	8,062.67	-2,714.26	8,487.34	1.13	-0.93	-0.65
20,813.00	91.25	326.190	10,832.37	8,141.10	-2,767.85	8,580.31	1.45	0.93	1.12
20,908.00	90.73	325.050	10,830.73	8,219.49	-2,821.48	8,673.27	1.32	-0.55	-1.20
21,002.00	90.81	324.960	10,829.47	8,296.49	-2,875.39	8,765.05	0.13	0.09	-0.10
21,097.00	91.38	324.430	10,827.65	8,374.01	-2,930.28	8,857.68	0.82	0.60	-0.56
21,192.00	91.56	324.340	10,825.22	8,451.21	-2,985.58	8,950.18	0.21	0.19	-0.09
21,287.00	91.34	324.430	10,822.81	8,528.42	-3,040.89	9,042.69	0.25	-0.23	0.09
21,381.00	91.74	323.900	10,820.29	8,604.59	-3,095.90	9,134.13	0.71	0.43	-0.56
21,476.00	92.00	324.340	10,817.19	8,681.53	-3,151.55	9,226.51	0.54	0.27	0.46
21,571.00	91.60	324.340	10,814.20	8,758.67	-3,206.90	9,318.98	0.42	-0.42	0.00
21,666.00	91.47	324.340	10,811.66	8,835.83	-3,262.27	9,411.47	0.14	-0.14	0.00
21,760.00	90.77	323.990	10,809.82	8,912.02	-3,317.29	9,502.93	0.83	-0.74	-0.37
21,855.00	90.81	324.080	10,808.51	8,988.91	-3,373.08	9,595.32	0.10	0.04	0.09
21,950.00	91.38	324.340	10,806.69	9,065.95	-3,428.62	9,687.77	0.66	0.60	0.27
22,045.00	91.47	325.130	10,804.33	9,143.50	-3,483.45	9,780.40	0.84	0.09	0.83
22,139.00	91.25	325.400	10,802.10	9,220.72	-3,537.00	9,872.25	0.37	-0.23	0.29
22,234.00	91.30	325.400	10,799.99	9,298.90	-3,590.93	9,965.13	0.05	0.05	0.00
22,329.00	91.47	325.490	10,797.69	9,377.12	-3,644.80	10,058.02	0.20	0.18	0.09

Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia
Site: Michter
Well: Michter N-08HU (G)
Wellbore: Sidetrack 01
Design: Surveys Sidetrack 01

Local Co-ordinate Reference: Well Michter N-08HU (G)
TVD Reference: RKB=1128+25 @ 1153.00ft (H&P 611)
MD Reference: RKB=1128+25 @ 1153.00ft (H&P 611)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug1919_v14

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)
22,423.00	91.43	325.490	10,795.31	9,454.55	-3,698.04	10,149.94	0.04	-0.04	0.00
22,518.00	91.38	325.050	10,792.98	9,532.60	-3,752.14	10,242.77	0.47	-0.05	-0.46
22,613.00	92.09	325.130	10,790.11	9,610.47	-3,806.49	10,335.51	0.75	0.75	0.08
22,707.00	92.31	325.570	10,786.50	9,687.74	-3,859.89	10,427.35	0.52	0.23	0.47
22,801.00	91.30	324.780	10,783.54	9,764.87	-3,913.54	10,519.15	1.36	-1.07	-0.84
22,896.00	91.60	324.780	10,781.13	9,842.45	-3,968.31	10,611.80	0.32	0.32	0.00
22,991.00	91.82	325.310	10,778.30	9,920.28	-4,022.72	10,704.53	0.60	0.23	0.56
23,086.00	92.53	326.450	10,774.69	9,998.87	-4,075.97	10,797.52	1.41	0.75	1.20
23,181.00	92.79	326.540	10,770.28	10,078.00	-4,128.35	10,890.68	0.29	0.27	0.09
23,252.00	92.75	327.160	10,766.85	10,137.37	-4,167.13	10,960.39	0.87	-0.06	0.87
Survey @ 23252.00 MD 10766.85 TVD									
23,311.00	92.75	327.160	10,764.02	10,186.89	-4,199.09	11,018.37	0.00	0.00	0.00
Survey projected to 23311.00 MD 10764.02 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,630.00	3,627.47	-36.38	22.19	Tie into original hole @ 3630 MD
23,252.00	10,766.85	10,137.37	-4,167.13	Survey @ 23252.00 MD 10766.85 TVD

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

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

Site	Michter				
Site Position:		Northing:	14,454,962.42 usft	Latitude:	39.80272253
From:	Lat/Long	Easting:	1,697,325.45 usft	Longitude:	-80.79737330
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.130 °

Well	Michter N-08HU (G)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,053.20 usft	Latitude:	39.80297218
	+E/-W	0.00 ft	Easting:	1,697,268.90 usft	Longitude:	-80.79757391
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,128.00 ft

Wellbore	Sidetrack 01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/21/2020	-8.722	66.736	51,855.09424022

Design	Surveys Sidetrack 01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	3,630.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	337.470	

Survey Program	Date	10/18/2020		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
186.00	788.00	MWD surf (Original Hole)	MWD	MWD - Standard
822.00	2,608.00	MWD int (Original Hole)	MWD	MWD - Standard
2,682.00	3,630.00	MWD (Original Hole)	MWD	MWD - Standard
3,726.00	10,138.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard
10,203.00	23,252.00	MWD lat (Sidetrack 01)	MWD	MWD - Standard
23,311.00	23,311.00	Projection (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	14,455,053.20	1,697,268.90	39.80297218	-80.79757391	
186.00	0.21	236.360	186.00	-0.19	-0.28	14,455,053.01	1,697,268.62	39.80297167	-80.79757492	
232.00	0.17	228.010	232.00	-0.28	-0.40	14,455,052.92	1,697,268.50	39.80297141	-80.79757535	
322.00	0.13	288.130	322.00	-0.34	-0.60	14,455,052.86	1,697,268.30	39.80297126	-80.79757605	
367.00	0.04	81.500	367.00	-0.32	-0.63	14,455,052.88	1,697,268.27	39.80297131	-80.79757617	
413.00	0.13	296.570	413.00	-0.29	-0.66	14,455,052.90	1,697,268.24	39.80297138	-80.79757628	
458.00	0.13	298.150	458.00	-0.25	-0.76	14,455,052.95	1,697,268.14	39.80297151	-80.79757660	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
503.00	0.17	317.130	503.00	-0.17	-0.85	14,455,053.02	1,697,268.05	39.80297171	-80.79757692	
551.00	0.17	293.050	551.00	-0.09	-0.96	14,455,053.10	1,697,267.94	39.80297193	-80.79757733	
598.00	0.22	304.480	598.00	-0.02	-1.10	14,455,053.18	1,697,267.80	39.80297214	-80.79757782	
623.00	0.22	318.100	623.00	0.05	-1.17	14,455,053.25	1,697,267.73	39.80297232	-80.79757808	
693.00	0.22	317.220	693.00	0.25	-1.35	14,455,053.44	1,697,267.55	39.80297286	-80.79757872	
740.00	0.22	333.750	740.00	0.39	-1.45	14,455,053.59	1,697,267.45	39.80297327	-80.79757908	
788.00	0.08	293.930	788.00	0.49	-1.52	14,455,053.69	1,697,267.38	39.80297353	-80.79757933	
822.00	0.08	293.930	822.00	0.51	-1.57	14,455,053.71	1,697,267.33	39.80297359	-80.79757949	
1,063.00	0.44	143.290	1,062.99	-0.17	-1.17	14,455,053.03	1,697,267.73	39.80297173	-80.79757807	
1,158.00	0.66	161.830	1,157.99	-0.98	-0.78	14,455,052.22	1,697,268.12	39.80296950	-80.79757669	
1,253.00	0.84	173.260	1,252.98	-2.19	-0.53	14,455,051.01	1,697,268.37	39.80296617	-80.79757580	
1,347.00	0.92	184.500	1,346.97	-3.63	-0.50	14,455,049.57	1,697,268.40	39.80296223	-80.79757574	
1,442.00	0.87	179.410	1,441.96	-5.11	-0.56	14,455,048.09	1,697,268.34	39.80295816	-80.79757594	
1,537.00	1.09	185.120	1,536.95	-6.73	-0.63	14,455,046.47	1,697,268.27	39.80295371	-80.79757621	
1,632.00	1.27	202.610	1,631.93	-8.60	-1.12	14,455,044.60	1,697,267.78	39.80294857	-80.79757795	
1,727.00	2.02	208.690	1,726.89	-11.04	-2.32	14,455,042.16	1,697,266.58	39.80294187	-80.79758228	
1,821.00	3.25	207.620	1,820.79	-14.86	-4.36	14,455,038.34	1,697,264.54	39.80293141	-80.79758954	
1,916.00	3.29	199.800	1,915.63	-19.81	-6.53	14,455,033.39	1,697,262.37	39.80291783	-80.79759731	
2,011.00	3.30	186.800	2,010.48	-25.09	-7.77	14,455,028.11	1,697,261.13	39.80290334	-80.79760179	
2,106.00	3.39	177.040	2,105.31	-30.61	-7.95	14,455,022.59	1,697,260.95	39.80288818	-80.79760247	
2,200.00	1.06	132.300	2,199.24	-33.97	-7.17	14,455,019.23	1,697,261.73	39.80287894	-80.79759970	
2,295.00	1.98	42.390	2,294.22	-33.35	-5.41	14,455,019.85	1,697,263.49	39.80288064	-80.79759344	
2,390.00	1.89	16.630	2,389.17	-30.63	-3.85	14,455,022.57	1,697,265.05	39.80288808	-80.79758788	
2,484.00	1.09	337.610	2,483.13	-28.32	-3.75	14,455,024.88	1,697,265.15	39.80289443	-80.79758750	
2,579.00	1.66	291.820	2,578.11	-26.97	-5.37	14,455,026.22	1,697,263.53	39.80289813	-80.79759326	
2,608.00	1.75	288.300	2,607.10	-26.68	-6.18	14,455,026.52	1,697,262.72	39.80289895	-80.79759614	
2,682.00	1.88	279.600	2,681.06	-26.12	-8.45	14,455,027.08	1,697,260.45	39.80290049	-80.79760422	
2,777.00	1.66	267.740	2,776.01	-25.92	-11.36	14,455,027.28	1,697,257.54	39.80290108	-80.79761458	
2,872.00	1.01	250.160	2,870.99	-26.26	-13.53	14,455,026.94	1,697,255.37	39.80290016	-80.79762229	
2,967.00	0.96	198.740	2,965.98	-27.29	-14.57	14,455,025.91	1,697,254.33	39.80289732	-80.79762601	
3,061.00	1.09	155.680	3,059.96	-28.85	-14.46	14,455,024.35	1,697,254.44	39.80289303	-80.79762561	
3,156.00	1.76	125.800	3,154.93	-30.53	-12.90	14,455,022.67	1,697,256.00	39.80288842	-80.79762009	
3,251.00	3.21	110.160	3,249.84	-32.30	-9.22	14,455,020.90	1,697,259.68	39.80288353	-80.79760700	
3,346.00	4.40	103.740	3,344.63	-34.08	-3.18	14,455,019.12	1,697,265.72	39.80287860	-80.79758552	
3,440.00	5.31	99.520	3,438.29	-35.66	4.61	14,455,017.54	1,697,273.51	39.80287422	-80.79755779	
3,535.00	5.45	92.750	3,532.88	-36.60	13.45	14,455,016.60	1,697,282.35	39.80287158	-80.79752631	
3,630.00	5.14	84.050	3,627.47	-36.38	22.19	14,455,016.82	1,697,291.09	39.80287214	-80.79749519	
Tie into original hole @ 3630 MD										
3,726.00	4.26	100.490	3,723.15	-36.58	29.97	14,455,016.62	1,697,298.87	39.80287153	-80.79746748	
3,771.00	5.10	120.090	3,768.01	-37.89	33.35	14,455,015.31	1,697,302.25	39.80286792	-80.79745548	
3,821.00	6.15	125.800	3,817.77	-40.57	37.44	14,455,012.63	1,697,306.34	39.80286054	-80.79744092	
3,916.00	6.77	127.110	3,912.16	-46.92	46.04	14,455,006.28	1,697,314.94	39.80284303	-80.79741037	
4,010.00	6.33	118.150	4,005.55	-52.71	55.02	14,455,000.49	1,697,323.92	39.80282708	-80.79737842	
4,105.00	4.22	98.550	4,100.15	-55.70	63.10	14,454,997.50	1,697,332.00	39.80281881	-80.79734969	
4,200.00	3.25	112.180	4,194.95	-57.24	69.05	14,454,995.96	1,697,337.95	39.80281456	-80.79732852	
4,295.00	4.79	123.600	4,289.71	-60.45	74.85	14,454,992.75	1,697,343.75	39.80280570	-80.79730790	
4,389.00	6.37	122.720	4,383.27	-65.44	82.50	14,454,987.76	1,697,351.40	39.80279195	-80.79728068	
4,484.00	6.99	102.510	4,477.63	-69.54	92.58	14,454,983.66	1,697,361.48	39.80278062	-80.79724483	
4,579.00	6.86	79.920	4,571.96	-69.80	103.81	14,454,983.40	1,697,372.71	39.80277984	-80.79720484	
4,674.00	5.10	62.080	4,666.44	-66.83	113.13	14,454,986.37	1,697,382.03	39.80278794	-80.79717164	
4,768.00	4.26	62.870	4,760.13	-63.28	119.93	14,454,989.92	1,697,388.83	39.80279764	-80.79714740	
4,863.00	3.87	78.600	4,854.89	-61.04	126.22	14,454,992.16	1,697,395.12	39.80280376	-80.79712501	
4,958.00	4.61	73.860	4,949.63	-59.35	133.03	14,454,993.85	1,697,401.93	39.80280837	-80.79710075	
5,052.00	4.75	76.140	5,043.32	-57.36	140.43	14,454,995.84	1,697,409.33	39.80281377	-80.79707436	
5,147.00	4.79	73.150	5,137.99	-55.27	148.05	14,454,997.93	1,697,416.95	39.80281947	-80.79704723	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,242.00	4.35	88.710	5,232.69	-54.04	155.45	14,454,999.16	1,697,424.35	39.80282280	-80.79702088	
5,337.00	4.57	82.470	5,327.41	-53.46	162.80	14,454,999.74	1,697,431.70	39.80282434	-80.79699469	
5,443.00	4.75	94.600	5,433.06	-53.26	171.36	14,454,999.94	1,697,440.26	39.80282484	-80.79696420	
5,526.00	5.19	92.050	5,515.75	-53.67	178.54	14,454,999.53	1,697,447.44	39.80282367	-80.79693865	
5,621.00	4.97	89.500	5,610.37	-53.79	186.95	14,454,999.41	1,697,455.85	39.80282330	-80.79690871	
5,716.00	5.93	89.680	5,704.94	-53.73	195.97	14,454,999.47	1,697,464.87	39.80282341	-80.79687659	
5,811.00	5.58	87.040	5,799.46	-53.46	205.49	14,454,999.74	1,697,474.39	39.80282409	-80.79684269	
5,905.00	5.05	78.070	5,893.06	-52.37	214.10	14,455,000.83	1,697,483.00	39.80282703	-80.79681202	
6,000.00	5.19	76.930	5,987.68	-50.53	222.38	14,455,002.67	1,697,491.28	39.80283202	-80.79678253	
6,095.00	5.45	78.690	6,082.27	-48.68	230.99	14,455,004.52	1,697,499.89	39.80283706	-80.79675186	
6,158.00	5.71	78.950	6,144.97	-47.49	237.00	14,455,005.71	1,697,505.90	39.80284029	-80.79673046	
6,287.00	4.79	74.560	6,273.43	-44.83	248.49	14,455,008.37	1,697,517.39	39.80284753	-80.79668952	
6,382.00	4.88	75.350	6,368.09	-42.75	256.22	14,455,010.45	1,697,525.12	39.80285319	-80.79666198	
6,476.00	5.80	79.390	6,461.69	-40.86	264.76	14,455,012.34	1,697,533.66	39.80285832	-80.79663156	
6,571.00	7.69	81.680	6,556.02	-39.06	275.77	14,455,014.14	1,697,544.66	39.80286320	-80.79659235	
6,666.00	10.42	85.630	6,649.83	-37.48	290.62	14,455,015.72	1,697,559.52	39.80286743	-80.79653944	
6,761.00	12.79	89.850	6,742.88	-36.80	309.71	14,455,016.40	1,697,578.61	39.80286919	-80.79647148	
6,855.00	17.67	92.930	6,833.56	-37.50	334.38	14,455,015.70	1,697,603.27	39.80286710	-80.79638366	
6,949.00	21.05	92.490	6,922.23	-38.97	365.50	14,455,014.23	1,697,634.40	39.80286289	-80.79627286	
7,045.00	24.30	91.300	7,010.80	-40.16	402.48	14,455,013.04	1,697,671.38	39.80285937	-80.79614119	
7,139.00	23.33	91.080	7,096.79	-40.95	440.43	14,455,012.25	1,697,709.33	39.80285697	-80.79606069	
7,233.00	22.37	89.850	7,183.42	-41.26	476.93	14,455,011.94	1,697,745.82	39.80285590	-80.79587614	
7,328.00	23.25	88.530	7,270.99	-40.73	513.75	14,455,012.47	1,697,782.65	39.80285712	-80.79574502	
7,423.00	23.16	88.970	7,358.30	-39.91	551.17	14,455,013.29	1,697,820.07	39.80285913	-80.79561177	
7,518.00	23.91	87.740	7,445.40	-38.82	589.09	14,455,014.38	1,697,857.99	39.80286190	-80.79547676	
7,613.00	25.53	87.210	7,531.69	-37.06	628.77	14,455,016.14	1,697,897.67	39.80286647	-80.79533544	
7,707.00	27.03	84.840	7,615.97	-34.15	670.28	14,455,019.05	1,697,939.18	39.80287420	-80.79518762	
7,802.00	26.85	85.190	7,700.66	-30.41	713.16	14,455,022.79	1,697,982.06	39.80288420	-80.79503492	
7,897.00	27.20	83.350	7,785.29	-26.10	756.11	14,455,027.10	1,698,025.00	39.80289577	-80.79488198	
7,992.00	27.38	83.080	7,869.72	-20.95	799.36	14,455,032.25	1,698,068.26	39.80290964	-80.79472794	
8,086.00	26.94	83.350	7,953.35	-15.88	841.97	14,455,037.32	1,698,110.86	39.80292329	-80.79457619	
8,181.00	25.27	83.170	8,038.66	-10.98	883.48	14,455,042.22	1,698,152.38	39.80293650	-80.79442835	
8,276.00	23.86	81.590	8,125.06	-5.76	922.62	14,455,047.44	1,698,191.52	39.80295059	-80.79428894	
8,370.00	23.33	83.520	8,211.20	-0.88	959.92	14,455,052.32	1,698,228.82	39.80296376	-80.79415608	
8,465.00	23.60	85.900	8,298.35	2.61	997.58	14,455,055.80	1,698,266.48	39.80297309	-80.79402196	
8,560.00	23.51	87.040	8,385.43	4.94	1,035.47	14,455,058.14	1,698,304.37	39.80297927	-80.79388703	
8,654.00	24.17	87.480	8,471.41	6.76	1,073.42	14,455,059.96	1,698,342.32	39.80298401	-80.79375189	
8,749.00	25.44	87.040	8,557.65	8.67	1,113.23	14,455,061.87	1,698,382.13	39.80298900	-80.79361014	
8,844.00	25.75	86.690	8,643.32	10.91	1,154.21	14,455,064.11	1,698,423.11	39.80299491	-80.79346421	
8,939.00	24.48	88.530	8,729.34	12.61	1,194.49	14,455,065.81	1,698,463.39	39.80299931	-80.79332078	
9,034.00	25.09	88.090	8,815.59	13.78	1,234.30	14,455,066.98	1,698,503.20	39.80300229	-80.79317903	
9,127.00	25.05	87.570	8,899.83	15.28	1,273.68	14,455,068.48	1,698,542.57	39.80300614	-80.79303882	
9,222.00	24.87	88.530	8,985.96	16.64	1,313.74	14,455,069.84	1,698,582.64	39.80300963	-80.79289615	
9,317.00	25.75	86.860	9,071.84	18.28	1,354.32	14,455,071.48	1,698,623.21	39.80301388	-80.79275167	
9,411.00	25.75	85.630	9,156.50	20.96	1,395.06	14,455,074.16	1,698,663.96	39.80302097	-80.79260656	
9,506.00	25.58	85.630	9,242.13	24.09	1,436.09	14,455,077.29	1,698,704.99	39.80302932	-80.79246046	
9,601.00	25.75	86.160	9,327.76	27.04	1,477.13	14,455,080.24	1,698,746.03	39.80303714	-80.79231431	
9,696.00	26.06	84.580	9,413.21	30.39	1,518.49	14,455,083.59	1,698,787.39	39.80304609	-80.79216701	
9,791.00	26.24	84.140	9,498.49	34.51	1,560.16	14,455,087.71	1,698,829.06	39.80305712	-80.79201862	
9,885.00	25.97	84.750	9,582.90	38.51	1,601.33	14,455,091.71	1,698,870.22	39.80306786	-80.79187201	
9,980.00	25.88	85.720	9,668.34	41.96	1,642.72	14,455,095.16	1,698,911.61	39.80307707	-80.79172462	
10,075.00	25.58	86.510	9,753.92	44.76	1,683.86	14,455,097.96	1,698,952.76	39.80308449	-80.79157809	
10,138.00	25.36	87.830	9,810.80	46.10	1,710.92	14,455,099.30	1,698,979.82	39.80308799	-80.79148174	
10,207.00	26.29	90.820	9,872.91	46.44	1,740.97	14,455,099.64	1,699,009.86	39.80308873	-80.79137475	
10,254.00	27.87	90.990	9,914.76	46.10	1,762.36	14,455,099.30	1,699,031.26	39.80308767	-80.79129858	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
10,302.00	29.80	89.850	9,956.80	45.94	1,785.51	14,455,099.14	1,699,054.40	39.80308707	-80.79121617	
10,349.00	31.08	87.040	9,997.33	46.59	1,809.30	14,455,099.79	1,699,078.20	39.80308872	-80.79113144	
10,397.00	35.03	83.080	10,037.56	48.89	1,835.37	14,455,102.09	1,699,104.26	39.80309488	-80.79103862	
10,444.00	37.80	84.230	10,075.37	51.97	1,863.09	14,455,105.17	1,699,131.99	39.80310314	-80.79093987	
10,491.00	37.80	83.870	10,112.51	54.95	1,891.74	14,455,108.15	1,699,160.64	39.80311116	-80.79083783	
10,538.00	39.82	84.140	10,149.13	58.03	1,921.04	14,455,111.23	1,699,189.93	39.80311941	-80.79073350	
10,586.00	41.89	84.310	10,185.44	61.19	1,952.28	14,455,114.39	1,699,221.17	39.80312789	-80.79062225	
10,633.00	43.65	86.600	10,219.94	63.71	1,984.09	14,455,116.91	1,699,252.98	39.80313460	-80.79050897	
10,681.00	44.13	85.900	10,254.53	65.88	2,017.29	14,455,119.08	1,699,286.19	39.80314036	-80.79039072	
10,728.00	44.92	79.480	10,288.06	70.08	2,049.94	14,455,123.28	1,699,318.84	39.80315169	-80.79027442	
10,775.00	45.49	75.880	10,321.18	77.20	2,082.52	14,455,130.40	1,699,351.41	39.80317103	-80.79015839	
10,822.00	46.37	71.660	10,353.88	86.65	2,114.92	14,455,139.85	1,699,383.82	39.80319676	-80.79004293	
10,870.00	47.12	64.100	10,386.79	99.81	2,147.26	14,455,153.00	1,699,416.15	39.80323268	-80.78992769	
10,917.00	47.38	59.000	10,418.71	116.24	2,177.58	14,455,169.44	1,699,446.48	39.80327762	-80.78981958	
10,965.00	46.73	54.170	10,451.42	135.57	2,206.90	14,455,188.77	1,699,475.79	39.80333052	-80.78971504	
11,012.00	46.46	49.600	10,483.73	156.63	2,233.75	14,455,209.83	1,699,502.65	39.80338819	-80.78961925	
11,060.00	46.90	46.520	10,516.66	179.97	2,259.72	14,455,233.17	1,699,528.61	39.80345212	-80.78952659	
11,107.00	47.08	42.130	10,548.73	204.55	2,283.72	14,455,257.75	1,699,552.62	39.80351945	-80.78944093	
11,154.00	47.47	36.500	10,580.63	231.24	2,305.58	14,455,284.44	1,699,574.47	39.80359262	-80.78936289	
11,201.00	48.35	31.670	10,612.15	260.12	2,325.10	14,455,313.32	1,699,594.00	39.80367180	-80.78929312	
11,249.00	49.10	26.220	10,643.82	291.67	2,342.54	14,455,344.87	1,699,611.44	39.80375833	-80.78923077	
11,296.00	49.32	23.850	10,674.53	323.91	2,357.60	14,455,377.11	1,699,626.49	39.80384677	-80.78917689	
11,344.00	50.59	20.240	10,705.42	357.96	2,371.37	14,455,411.16	1,699,640.27	39.80394019	-80.78912755	
11,391.00	52.40	15.320	10,734.69	392.97	2,382.58	14,455,446.17	1,699,651.47	39.80403627	-80.78908736	
11,438.00	55.25	10.050	10,762.44	429.96	2,390.87	14,455,483.16	1,699,659.77	39.80413781	-80.78905751	
11,485.00	58.59	5.210	10,788.10	468.97	2,396.07	14,455,522.17	1,699,664.96	39.80424491	-80.78903869	
11,533.00	60.84	1.260	10,812.31	510.34	2,398.39	14,455,563.54	1,699,667.28	39.80435851	-80.78903008	
11,580.00	63.91	358.010	10,834.11	551.97	2,398.11	14,455,605.17	1,699,667.00	39.80447283	-80.78903073	
11,627.00	66.02	355.460	10,854.00	594.48	2,395.67	14,455,647.68	1,699,664.57	39.80458959	-80.78903904	
11,674.00	67.74	351.590	10,872.46	637.42	2,390.79	14,455,690.61	1,699,659.69	39.80470753	-80.78905606	
11,722.00	70.15	348.600	10,889.71	681.53	2,383.08	14,455,734.73	1,699,651.97	39.80482874	-80.78908316	
11,769.00	72.97	346.580	10,904.57	725.07	2,373.49	14,455,778.27	1,699,642.39	39.80494836	-80.78911692	
11,817.00	75.12	344.210	10,917.77	769.72	2,361.85	14,455,822.92	1,699,630.75	39.80507106	-80.78915800	
11,864.00	77.27	342.800	10,928.98	813.48	2,348.89	14,455,866.68	1,699,617.79	39.80519132	-80.78920378	
11,911.00	79.25	341.220	10,938.55	857.24	2,334.68	14,455,910.44	1,699,603.57	39.80531160	-80.78925402	
11,958.00	80.88	339.020	10,946.66	900.77	2,318.93	14,455,953.97	1,699,587.83	39.80543125	-80.78930971	
12,006.00	82.11	336.300	10,953.76	944.68	2,300.89	14,455,997.88	1,699,569.79	39.80555193	-80.78937359	
12,053.00	83.03	333.660	10,959.83	986.90	2,281.18	14,456,040.10	1,699,550.08	39.80566803	-80.78944342	
12,100.00	84.84	331.200	10,964.80	1,028.33	2,259.55	14,456,081.53	1,699,528.45	39.80578193	-80.78952009	
12,147.00	86.46	328.390	10,968.37	1,068.82	2,235.98	14,456,122.02	1,699,504.87	39.80589329	-80.78960370	
12,195.00	87.91	325.570	10,970.72	1,109.02	2,209.85	14,456,162.21	1,699,478.75	39.80600384	-80.78969637	
12,242.00	90.24	322.850	10,971.48	1,147.13	2,182.37	14,456,200.33	1,699,451.27	39.80610869	-80.78979390	
12,290.00	90.73	322.760	10,971.08	1,185.37	2,153.36	14,456,238.56	1,699,422.25	39.80621388	-80.78989690	
12,384.00	91.25	323.200	10,969.45	1,260.41	2,096.77	14,456,313.60	1,699,365.67	39.80642032	-80.79009776	
12,479.00	89.71	322.670	10,968.66	1,336.21	2,039.52	14,456,389.40	1,699,308.41	39.80662886	-80.79030100	
12,574.00	89.63	322.670	10,969.20	1,411.74	1,981.91	14,456,464.94	1,699,250.80	39.80683668	-80.79050549	
12,669.00	89.85	323.730	10,969.64	1,487.81	1,925.00	14,456,541.01	1,699,193.90	39.80704594	-80.79070748	
12,764.00	90.07	325.050	10,969.70	1,565.05	1,869.69	14,456,618.24	1,699,138.58	39.80725840	-80.79090380	
12,858.00	91.03	325.050	10,968.80	1,642.09	1,815.84	14,456,695.28	1,699,084.74	39.80747033	-80.79109489	
12,953.00	91.38	325.220	10,966.80	1,720.02	1,761.55	14,456,773.21	1,699,030.44	39.80768469	-80.79128757	
13,048.00	91.21	324.430	10,964.65	1,797.65	1,706.84	14,456,850.85	1,698,975.73	39.80789824	-80.79148175	
13,142.00	90.68	324.260	10,963.10	1,874.02	1,652.05	14,456,927.21	1,698,920.95	39.80810832	-80.79167620	
13,237.00	91.74	325.400	10,961.10	1,951.66	1,597.34	14,457,004.85	1,698,866.24	39.80832188	-80.79187035	
13,332.00	92.13	324.960	10,957.89	2,029.60	1,543.13	14,457,082.80	1,698,812.03	39.80853629	-80.79206275	
13,427.00	91.78	325.570	10,954.65	2,107.63	1,489.03	14,457,160.82	1,698,757.93	39.80875091	-80.79225474	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,521.00	92.18	325.130	10,951.40	2,184.91	1,435.62	14,457,238.10	1,698,704.52	39.80896348	-80.79244429
13,616.00	91.08	324.520	10,948.70	2,262.53	1,380.92	14,457,315.72	1,698,649.81	39.80917699	-80.79263845
13,711.00	90.51	324.520	10,947.38	2,339.88	1,325.78	14,457,393.08	1,698,594.68	39.80938978	-80.79283413
13,806.00	90.55	325.050	10,946.50	2,417.49	1,271.00	14,457,470.69	1,698,539.90	39.80960326	-80.79302856
13,901.00	90.64	323.730	10,945.52	2,494.72	1,215.69	14,457,547.91	1,698,484.59	39.80981571	-80.79322488
13,995.00	90.59	324.780	10,944.51	2,571.01	1,160.78	14,457,624.20	1,698,429.68	39.81002556	-80.79341977
14,090.00	90.64	324.170	10,943.49	2,648.32	1,105.59	14,457,701.51	1,698,374.48	39.81023823	-80.79361569
14,185.00	90.86	324.170	10,942.24	2,725.33	1,049.98	14,457,778.53	1,698,318.88	39.81045008	-80.79381307
14,280.00	90.33	323.290	10,941.26	2,801.92	993.78	14,457,855.12	1,698,262.68	39.81066077	-80.79401255
14,374.00	90.33	324.170	10,940.72	2,877.71	938.17	14,457,930.90	1,698,207.07	39.81086924	-80.79420995
14,469.00	91.34	324.610	10,939.33	2,954.93	882.86	14,458,008.13	1,698,151.76	39.81108167	-80.79440627
14,564.00	91.69	324.960	10,936.82	3,032.52	828.10	14,458,085.71	1,698,097.00	39.81129509	-80.79460064
14,658.00	91.91	325.050	10,933.87	3,109.49	774.22	14,458,162.68	1,698,043.12	39.81150680	-80.79479189
14,753.00	90.73	325.490	10,931.68	3,187.54	720.11	14,458,240.73	1,697,989.01	39.81172150	-80.79498392
14,848.00	90.29	324.960	10,930.83	3,265.57	665.93	14,458,318.76	1,697,934.83	39.81193613	-80.79517623
14,942.00	90.46	326.010	10,930.22	3,343.02	612.67	14,458,396.21	1,697,881.57	39.81214916	-80.79536526
15,037.00	90.86	326.980	10,929.12	3,422.23	560.23	14,458,475.42	1,697,829.13	39.81236702	-80.79555134
15,132.00	90.20	326.280	10,928.24	3,501.56	507.98	14,458,554.75	1,697,776.88	39.81258522	-80.79573676
15,227.00	90.42	325.660	10,927.73	3,580.29	454.82	14,458,633.48	1,697,723.72	39.81280176	-80.79592544
15,322.00	90.64	325.570	10,926.85	3,658.69	401.17	14,458,711.88	1,697,670.07	39.81301739	-80.79611585
15,416.00	90.02	325.050	10,926.31	3,735.98	347.67	14,458,789.17	1,697,616.57	39.81322998	-80.79630573
15,511.00	90.64	325.570	10,925.76	3,814.09	293.61	14,458,867.28	1,697,562.51	39.81344483	-80.79649763
15,605.00	91.74	324.870	10,923.81	3,891.28	240.00	14,458,944.47	1,697,508.90	39.81365715	-80.79668791
15,699.00	91.21	325.310	10,921.39	3,968.33	186.22	14,459,021.53	1,697,455.12	39.81386911	-80.79687879
15,794.00	91.21	325.660	10,919.39	4,046.59	132.41	14,459,099.79	1,697,401.30	39.81408437	-80.79706981
15,888.00	90.29	324.430	10,918.15	4,123.63	78.56	14,459,176.82	1,697,347.46	39.81429626	-80.79726095
15,983.00	91.52	324.170	10,916.65	4,200.77	23.13	14,459,253.96	1,697,292.03	39.81450844	-80.79745771
16,077.00	90.68	323.640	10,914.85	4,276.71	-32.24	14,459,329.90	1,697,236.66	39.81471734	-80.79765427
16,172.00	92.09	324.430	10,912.55	4,353.57	-88.01	14,459,406.76	1,697,180.89	39.81492877	-80.79785227
16,267.00	91.87	324.260	10,909.27	4,430.72	-143.36	14,459,483.91	1,697,125.54	39.81514098	-80.79804874
16,361.00	91.91	324.170	10,906.17	4,506.93	-198.29	14,459,560.12	1,697,070.61	39.81535062	-80.79824376
16,456.00	90.02	323.550	10,904.57	4,583.63	-254.31	14,459,636.83	1,697,014.59	39.81556162	-80.79844263
16,551.00	90.68	325.220	10,903.99	4,660.86	-309.63	14,459,714.05	1,696,959.27	39.81577404	-80.79863901
16,645.00	89.41	324.430	10,903.92	4,737.69	-363.78	14,459,790.88	1,696,905.12	39.81598538	-80.79883124
16,740.00	89.49	324.080	10,904.83	4,814.79	-419.27	14,459,867.98	1,696,849.63	39.81619746	-80.79902825
16,835.00	89.10	324.260	10,906.00	4,891.81	-474.88	14,459,945.00	1,696,794.02	39.81640931	-80.79922566
16,929.00	90.46	324.780	10,906.36	4,968.35	-529.44	14,460,021.54	1,696,739.46	39.81661985	-80.79941934
17,024.00	89.80	324.080	10,906.14	5,045.63	-584.70	14,460,098.82	1,696,684.20	39.81683240	-80.79961552
17,119.00	91.21	324.870	10,905.31	5,122.94	-639.89	14,460,176.13	1,696,629.01	39.81704506	-80.79981147
17,214.00	91.12	325.050	10,903.37	5,200.70	-694.43	14,460,253.89	1,696,574.47	39.81725896	-80.80000506
17,308.00	90.42	324.260	10,902.11	5,277.37	-748.80	14,460,330.56	1,696,520.10	39.81746984	-80.80019809
17,403.00	91.87	324.960	10,900.21	5,354.80	-803.81	14,460,407.99	1,696,465.10	39.81768281	-80.80039336
17,498.00	91.74	324.780	10,897.22	5,432.45	-858.44	14,460,485.64	1,696,410.46	39.81789641	-80.80058733
17,592.00	91.08	324.780	10,894.91	5,509.22	-912.64	14,460,562.41	1,696,356.26	39.81810757	-80.80077973
17,687.00	90.81	324.520	10,893.34	5,586.70	-967.60	14,460,639.89	1,696,301.31	39.81832067	-80.80097483
17,782.00	90.55	323.990	10,892.21	5,663.80	-1,023.09	14,460,716.98	1,696,245.81	39.81853274	-80.80117185
17,877.00	90.24	323.900	10,891.56	5,740.60	-1,079.00	14,460,793.79	1,696,189.90	39.81874400	-80.80137036
17,971.00	92.04	324.690	10,889.69	5,816.91	-1,133.85	14,460,870.10	1,696,135.06	39.81895391	-80.80156509
18,066.00	92.22	324.430	10,886.16	5,894.25	-1,188.89	14,460,947.44	1,696,080.01	39.81916665	-80.80176052
18,161.00	91.60	324.170	10,882.99	5,971.36	-1,244.30	14,461,024.55	1,696,024.60	39.81937874	-80.80195723
18,256.00	91.56	324.340	10,880.37	6,048.43	-1,299.78	14,461,101.62	1,695,969.13	39.81959074	-80.80215420
18,350.00	91.03	323.820	10,878.25	6,124.54	-1,354.91	14,461,177.73	1,695,914.00	39.81980008	-80.80234994
18,445.00	90.46	325.930	10,877.01	6,202.23	-1,409.56	14,461,255.42	1,695,859.34	39.82001377	-80.80254397
18,540.00	90.11	325.840	10,876.54	6,280.88	-1,462.84	14,461,334.07	1,695,806.06	39.82023008	-80.80273310
18,634.00	90.29	325.660	10,876.21	6,358.58	-1,515.74	14,461,411.76	1,695,753.16	39.82044379	-80.80292091

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
18,729.00	90.64	325.930	10,875.44	6,437.14	-1,569.14	14,461,490.33	1,695,699.76	39.82065987	-80.80311048	
18,824.00	90.81	325.930	10,874.24	6,515.83	-1,622.36	14,461,569.02	1,695,646.54	39.82087629	-80.80329939	
18,918.00	90.64	325.840	10,873.05	6,593.65	-1,675.08	14,461,646.83	1,695,593.83	39.82109031	-80.80348653	
19,013.00	90.68	325.310	10,871.95	6,672.00	-1,728.78	14,461,725.19	1,695,540.13	39.82130582	-80.80367717	
19,108.00	91.47	325.400	10,870.17	6,750.15	-1,782.77	14,461,803.33	1,695,486.13	39.82152074	-80.80386887	
19,203.00	91.21	325.220	10,867.95	6,828.24	-1,836.83	14,461,881.42	1,695,432.08	39.82173553	-80.80406077	
19,297.00	91.25	325.130	10,865.93	6,905.38	-1,890.50	14,461,958.57	1,695,378.41	39.82194772	-80.80425131	
19,392.00	91.65	325.130	10,863.53	6,983.30	-1,944.79	14,462,036.49	1,695,324.11	39.82216202	-80.80444408	
19,517.00	91.82	324.780	10,859.74	7,065.59	-2,016.54	14,462,138.78	1,695,252.37	39.82244337	-80.80469880	
19,581.00	91.60	324.780	10,857.83	7,137.85	-2,053.43	14,462,191.04	1,695,215.47	39.82258711	-80.80482980	
19,676.00	91.82	324.960	10,855.00	7,215.51	-2,108.07	14,462,268.70	1,695,160.83	39.82280072	-80.80502380	
19,771.00	91.52	324.610	10,852.23	7,293.10	-2,162.83	14,462,346.28	1,695,106.07	39.82301410	-80.80521823	
19,865.00	91.43	323.730	10,849.81	7,369.28	-2,217.84	14,462,422.47	1,695,051.07	39.82322366	-80.80541355	
19,960.00	91.16	323.640	10,847.66	7,445.81	-2,274.08	14,462,498.99	1,694,994.82	39.82343416	-80.80561328	
20,055.00	90.99	323.550	10,845.88	7,522.26	-2,330.46	14,462,575.44	1,694,938.45	39.82364444	-80.80581346	
20,150.00	90.59	323.550	10,844.57	7,598.66	-2,386.89	14,462,651.85	1,694,882.01	39.82385461	-80.80601388	
20,244.00	91.08	324.340	10,843.20	7,674.65	-2,442.21	14,462,727.83	1,694,826.70	39.82406362	-80.80621031	
20,339.00	91.30	324.780	10,841.23	7,752.03	-2,497.28	14,462,805.22	1,694,771.62	39.82427645	-80.80640587	
20,434.00	91.12	324.780	10,839.22	7,829.62	-2,552.06	14,462,882.81	1,694,716.85	39.82448987	-80.80660036	
20,529.00	91.34	324.780	10,837.18	7,907.22	-2,606.83	14,462,960.40	1,694,662.07	39.82470328	-80.80679486	
20,623.00	91.25	325.750	10,835.06	7,984.44	-2,660.38	14,463,037.63	1,694,608.53	39.82491568	-80.80698497	
20,718.00	90.37	325.130	10,833.72	8,062.67	-2,714.26	14,463,115.85	1,694,554.64	39.82513083	-80.80717629	
20,813.00	91.25	326.190	10,832.37	8,141.10	-2,767.85	14,463,194.29	1,694,501.06	39.82534655	-80.80736654	
20,908.00	90.73	325.050	10,830.73	8,219.49	-2,821.48	14,463,272.68	1,694,447.42	39.82556214	-80.80755697	
21,002.00	90.81	324.960	10,829.47	8,296.49	-2,875.39	14,463,349.68	1,694,393.52	39.82577392	-80.80774837	
21,097.00	91.38	324.430	10,827.65	8,374.01	-2,930.28	14,463,427.19	1,694,338.63	39.82598711	-80.80794329	
21,192.00	91.56	324.340	10,825.22	8,451.21	-2,985.58	14,463,504.39	1,694,283.32	39.82619946	-80.80813968	
21,287.00	91.34	324.430	10,822.81	8,528.42	-3,040.89	14,463,581.60	1,694,228.02	39.82641182	-80.80833607	
21,381.00	91.74	323.900	10,820.29	8,604.59	-3,095.90	14,463,657.78	1,694,173.01	39.82662134	-80.80853143	
21,476.00	92.00	324.340	10,817.19	8,681.53	-3,151.55	14,463,734.71	1,694,117.36	39.82683295	-80.80872905	
21,571.00	91.60	324.340	10,814.20	8,758.67	-3,206.90	14,463,811.86	1,694,062.00	39.82704514	-80.80892563	
21,666.00	91.47	324.340	10,811.66	8,835.83	-3,262.27	14,463,889.02	1,694,006.64	39.82725736	-80.80912223	
21,760.00	90.77	323.990	10,809.82	8,912.02	-3,317.29	14,463,965.21	1,693,951.62	39.82746693	-80.80931763	
21,855.00	90.81	324.080	10,808.51	8,988.91	-3,373.08	14,464,042.09	1,693,895.83	39.82767839	-80.80951575	
21,950.00	91.38	324.340	10,806.69	9,065.95	-3,428.62	14,464,119.14	1,693,840.28	39.82789031	-80.80971301	
22,045.00	91.47	325.130	10,804.33	9,143.50	-3,483.45	14,464,196.68	1,693,785.45	39.82810358	-80.80990773	
22,139.00	91.25	325.400	10,802.10	9,220.72	-3,537.00	14,464,273.90	1,693,731.91	39.82831597	-80.81009786	
22,234.00	91.30	325.400	10,799.99	9,298.90	-3,590.93	14,464,352.08	1,693,677.98	39.82853099	-80.81028936	
22,329.00	91.47	325.490	10,797.69	9,377.12	-3,644.80	14,464,430.30	1,693,624.11	39.82874611	-80.81048064	
22,423.00	91.43	325.490	10,795.31	9,454.55	-3,698.04	14,464,507.73	1,693,570.87	39.82895907	-80.81066969	
22,518.00	91.38	325.050	10,792.98	9,532.60	-3,752.14	14,464,585.79	1,693,516.76	39.82917373	-80.81086182	
22,613.00	92.09	325.130	10,790.11	9,610.47	-3,806.49	14,464,663.65	1,693,462.42	39.82938789	-80.81105480	
22,707.00	92.31	325.570	10,786.50	9,687.74	-3,859.89	14,464,740.92	1,693,409.02	39.82960041	-80.81124444	
22,801.00	91.30	324.780	10,783.54	9,764.87	-3,913.54	14,464,818.05	1,693,355.36	39.82981252	-80.81143497	
22,896.00	91.60	324.780	10,781.13	9,842.45	-3,968.31	14,464,895.63	1,693,300.59	39.83002591	-80.81162947	
22,991.00	91.82	325.310	10,778.30	9,920.28	-4,022.72	14,464,973.46	1,693,246.19	39.83023996	-80.81182268	
23,086.00	92.53	326.450	10,774.69	9,998.87	-4,075.97	14,465,052.05	1,693,192.94	39.83045609	-80.81201176	
23,181.00	92.79	326.540	10,770.28	10,078.00	-4,128.35	14,465,131.18	1,693,140.56	39.83067370	-80.81219776	
23,252.00	92.75	327.160	10,766.85	10,137.37	-4,167.13	14,465,190.55	1,693,101.78	39.83083698	-80.81233544	
Survey @ 23252.00 MD 10766.85 TVD										
23,311.00	92.75	327.160	10,764.02	10,186.89	-4,199.09	14,465,240.07	1,693,069.82	39.83097314	-80.81244891	
Survey projected to 23311.00 MD 10764.02 TVD										

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-08HU (G)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-08HU (G)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Aug1919_v14

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,630.00	3,627.47	-36.38	22.19	Tie into original hole @ 3630 MD
23,252.00	10,766.85	10,137.37	-4,167.13	Survey @ 23252.00 MD 10766.85 TVD
23,311.00	10,764.02	10,186.89	-4,199.09	Survey projected to 23311.00 MD 10764.02 TVD