



Well: Michter N-06HU (I)
 Site: Michter
 Project: Marshall County, West Virginia
 Design: rev3

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V Sect	Annotation
1	9798.00	13.80	308.290	9729.55	336.21	-534.15	0.00	0.000	585.56	Survey @ 9798.00 MD 9729.55 TVD
2	9900.00	13.80	308.290	9828.60	351.29	-553.25	0.00	0.000	608.97	KOP Begin 6.25°/100' drop/turn
3	10115.83	5.47	232.794	10041.81	361.06	-581.79	6.25	-156.680	633.61	Begin 6.25°/100' build/turn
4	10919.38	50.00	322.908	10745.68	598.81	-812.93	6.25	94.690	961.74	Begin 8°/100' build/turn
5	11434.34	91.00	327.296	10914.00	989.76	-1082.70	8.00	6.6691436	61	Begin 91.00° lateral
6	16758.85	91.00	327.296	10821.00	5469.49	-3959.12	0.00	0.000	6752.03	PBHL/TD 16758.85 MD/10821.00 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	V Sect	Annotation
248.00	0.16	178.920	248.00	-0.35	0.01	-0.28	MWD surveys
16670.00	89.54	327.500	10844.15	5419.50	-3926.92	6692.66	Survey @ 16670.00 MD 10844.15 TVD
16723.00	89.54	327.500	10844.58	5464.20	-3955.40	6745.56	Survey projected to 16723.00 MD 10844.58 TVD



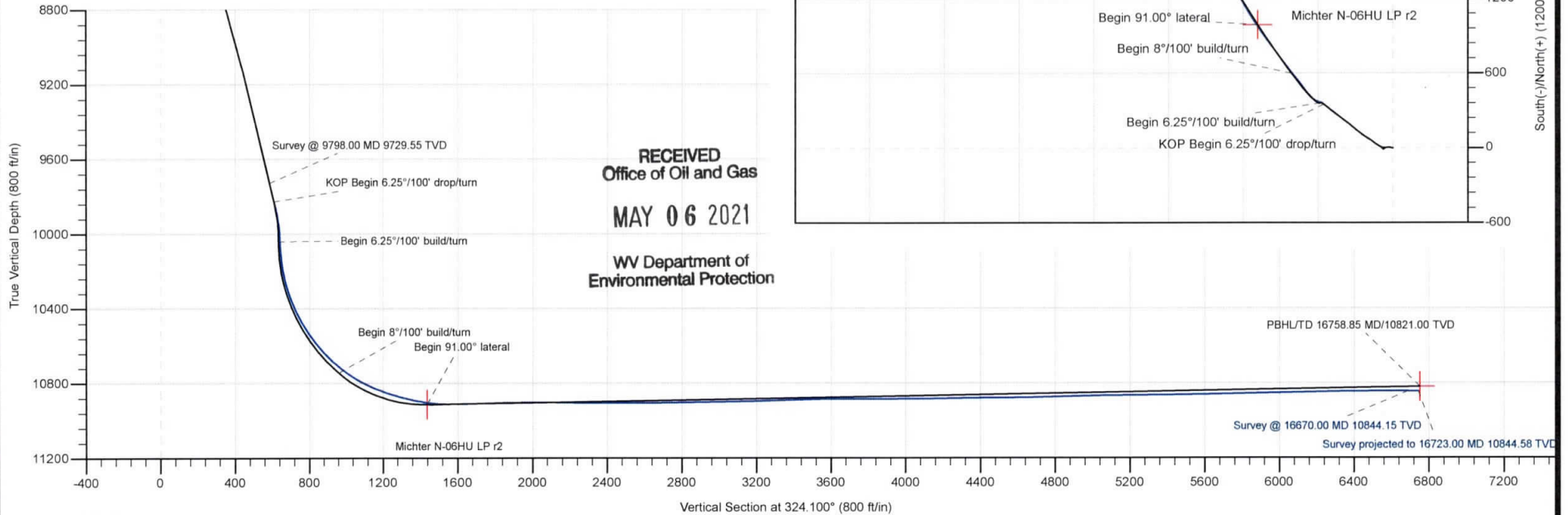
Azimuths to Grid North
 True North: -0.13°
 Magnetic North: -8.86°
 Magnetic Field
 Strength: 51827.1snT
 Dip Angle: 66.72°
 Date: 8/18/2020
 Model: IGRF2015

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

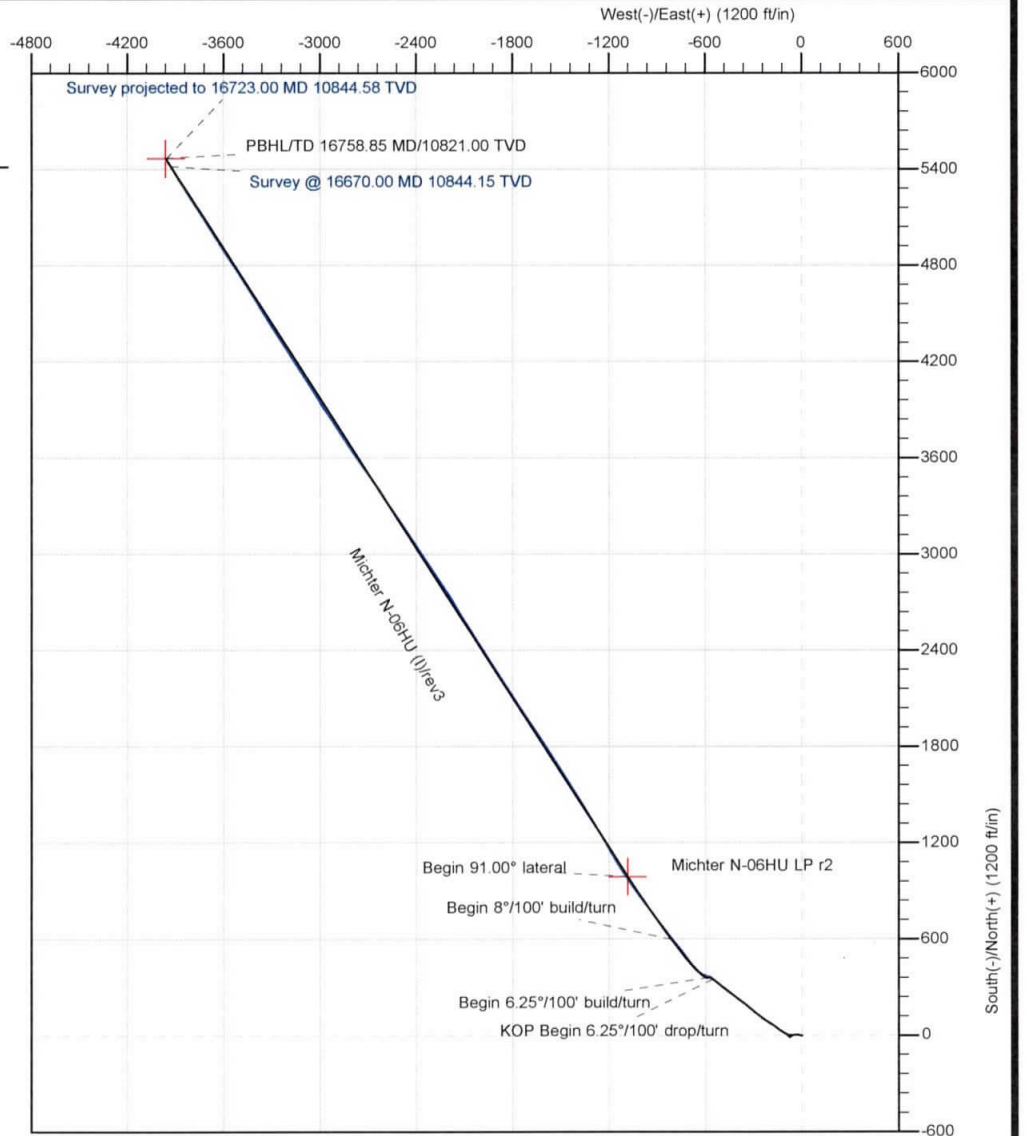
System Datum: Mean Sea Level
 Depth Reference: RKB=1128+25 @ 1153.00ft (H&P 611)

Northing	Easting	Latitude	Longitude
14455058.55	1697245.51	39.80298702	-80.79765714

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.86°



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



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	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-06HU (I)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,058.55 usft	Latitude:	39.80298702
	+E/-W	0.00 ft	Easting:	1,697,245.51 usft	Longitude:	-80.79765714
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	8/18/2020	-8.730	66.715	51,827.09899205

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		324.100

Survey Program	Date	9/5/2020			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
248.00	823.00	MWD surf (Original Hole)	MWD	MWD - Standard	
889.00	2,588.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,689.00	9,798.00	MWD (Original Hole)	MWD	MWD - Standard	
9,872.00	16,670.00	MWD lat (Original Hole)	MWD	MWD - Standard	
16,723.00	16,723.00	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	
248.00	0.16	178.920	248.00	-0.35	0.01	-0.28	0.06	0.06	0.00	
MWD surveys										
295.00	0.39	105.890	295.00	-0.46	0.16	-0.46	0.80	0.49	-155.38	
338.00	0.18	115.270	338.00	-0.52	0.36	-0.64	0.50	-0.49	21.81	
385.00	0.14	90.850	385.00	-0.56	0.49	-0.74	0.17	-0.09	-51.96	
429.00	0.17	317.030	429.00	-0.51	0.50	-0.70	0.65	0.07	-304.14	

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Site:	Michter	MD Reference:	RKB=1128+25 @ 1153.00ft (H&P 611)
Well:	Michter N-06HU (I)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

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)	
476.00	0.06	222.430	476.00	-0.48	0.43	-0.64	0.39	-0.23	-201.28	
520.00	0.08	245.510	520.00	-0.51	0.39	-0.64	0.08	0.05	52.45	
567.00	0.09	216.360	567.00	-0.55	0.34	-0.64	0.09	0.02	-62.02	
612.00	0.25	25.620	612.00	-0.49	0.36	-0.61	0.75	0.36	376.13	
646.00	0.31	328.840	646.00	-0.34	0.34	-0.48	0.80	0.18	-167.00	
702.00	0.40	357.070	702.00	-0.02	0.26	-0.17	0.35	0.16	50.41	
749.00	0.18	307.390	749.00	0.19	0.19	0.04	0.67	-0.47	-105.70	
793.00	0.35	33.860	793.00	0.34	0.21	0.16	0.87	0.39	196.52	
823.00	0.28	53.600	823.00	0.46	0.32	0.19	0.43	-0.23	65.80	
889.00	0.07	32.700	889.00	0.59	0.47	0.20	0.33	-0.32	-31.67	
984.00	0.13	136.630	983.99	0.56	0.58	0.12	0.17	0.06	109.40	
1,078.00	0.15	163.450	1,077.99	0.37	0.68	-0.10	0.07	0.02	28.53	
1,173.00	0.39	165.850	1,172.99	-0.07	0.80	-0.52	0.25	0.25	2.53	
1,268.00	0.45	237.980	1,267.99	-0.58	0.56	-0.80	0.52	0.06	75.93	
1,363.00	0.79	264.070	1,362.99	-0.84	-0.41	-0.44	0.46	0.36	27.46	
1,457.00	0.92	277.960	1,456.98	-0.81	-1.80	0.40	0.26	0.14	14.78	
1,552.00	1.91	294.490	1,551.95	-0.04	-4.00	2.31	1.12	1.04	17.40	
1,647.00	2.95	291.570	1,646.86	1.51	-7.71	5.75	1.10	1.09	-3.07	
1,742.00	3.56	291.870	1,741.71	3.51	-12.72	10.30	0.64	0.64	0.32	
1,836.00	3.67	290.670	1,835.52	5.66	-18.24	15.28	0.14	0.12	-1.28	
1,931.00	3.75	281.960	1,930.32	7.38	-24.13	20.12	0.60	0.08	-9.17	
2,026.00	4.39	268.810	2,025.08	7.94	-30.80	24.50	1.19	0.67	-13.84	
2,121.00	4.16	248.860	2,119.82	6.63	-37.65	27.44	1.58	-0.24	-21.00	
2,215.00	3.81	251.210	2,213.60	4.39	-43.79	29.23	0.41	-0.37	2.50	
2,310.00	3.75	266.410	2,308.39	3.18	-49.88	31.82	1.05	-0.06	16.00	
2,405.00	3.29	266.730	2,403.21	2.83	-55.70	34.95	0.48	-0.48	0.34	
2,500.00	3.38	262.270	2,498.05	2.30	-61.20	37.74	0.29	0.09	-4.69	
2,588.00	3.44	261.690	2,585.90	1.57	-66.38	40.19	0.08	0.07	-0.66	
2,689.00	5.10	259.670	2,686.61	0.32	-73.79	43.53	1.65	1.64	-2.00	
2,783.00	3.35	261.230	2,780.35	-0.85	-80.62	46.59	1.87	-1.86	1.66	
2,878.00	1.60	270.800	2,875.26	-1.25	-84.69	48.65	1.89	-1.84	10.07	
2,973.00	0.71	317.110	2,970.24	-0.80	-86.42	50.02	1.29	-0.94	48.75	
3,067.00	0.89	29.370	3,064.23	0.26	-86.45	50.91	1.02	0.19	76.87	
3,162.00	1.50	51.990	3,159.21	1.67	-85.11	51.26	0.80	0.64	23.81	
3,257.00	1.62	82.120	3,254.18	2.62	-82.80	50.68	0.86	0.13	31.72	
3,352.00	1.36	107.320	3,349.15	2.47	-80.40	49.14	0.73	-0.27	26.53	
3,446.00	0.91	111.460	3,443.13	1.86	-78.64	47.62	0.49	-0.48	4.40	
3,541.00	0.98	116.990	3,538.12	1.22	-77.21	46.26	0.12	0.07	5.82	
3,636.00	1.23	120.130	3,633.10	0.34	-75.60	44.61	0.27	0.26	3.31	
3,731.00	1.34	132.620	3,728.08	-0.92	-73.91	42.59	0.32	0.12	13.15	
3,825.00	1.02	144.320	3,822.06	-2.35	-72.61	40.67	0.42	-0.34	12.45	
3,920.00	0.26	135.660	3,917.05	-3.19	-71.96	39.61	0.80	-0.80	-9.12	
4,015.00	0.08	119.900	4,012.05	-3.38	-71.76	39.34	0.19	-0.19	-16.59	
4,110.00	0.28	198.070	4,107.05	-3.63	-71.77	39.14	0.29	0.21	82.28	

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Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

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)	
4,205.00	0.87	202.140	4,202.04	-4.52	-72.11	38.63	0.62	0.62	4.28	
4,299.00	1.62	198.110	4,296.02	-6.44	-72.80	37.47	0.80	0.80	-4.29	
4,394.00	1.85	216.920	4,390.98	-8.95	-74.14	36.22	0.64	0.24	19.80	
4,489.00	1.33	233.360	4,485.94	-10.83	-75.94	35.76	0.72	-0.55	17.31	
4,583.00	0.57	244.560	4,579.93	-11.68	-77.24	35.83	0.83	-0.81	11.91	
4,678.00	0.44	88.120	4,674.93	-11.87	-77.30	35.71	1.04	-0.14	-164.67	
4,773.00	0.92	72.420	4,769.92	-11.63	-76.21	35.27	0.54	0.51	-16.53	
4,867.00	1.05	71.210	4,863.91	-11.12	-74.67	34.78	0.14	0.14	-1.29	
4,962.00	0.72	64.430	4,958.89	-10.59	-73.31	34.41	0.36	-0.35	-7.14	
5,060.00	0.82	25.880	5,056.89	-9.69	-72.45	34.63	0.53	0.10	-39.34	
5,155.00	1.22	26.210	5,151.87	-8.17	-71.71	35.43	0.42	0.42	0.35	
5,249.00	1.71	30.530	5,245.84	-6.07	-70.55	36.46	0.53	0.52	4.60	
5,344.00	1.16	43.610	5,340.81	-4.15	-69.17	37.20	0.67	-0.58	13.77	
5,439.00	1.15	65.430	5,435.79	-3.06	-67.64	37.19	0.46	-0.01	22.97	
5,534.00	1.12	50.330	5,530.77	-2.07	-66.06	37.06	0.32	-0.03	-15.89	
5,629.00	0.74	90.540	5,625.76	-1.48	-64.73	36.76	0.77	-0.40	42.33	
5,723.00	0.76	122.400	5,719.75	-1.82	-63.60	35.82	0.44	0.02	33.89	
5,818.00	0.21	85.560	5,814.75	-2.14	-62.89	35.14	0.64	-0.58	-38.78	
5,913.00	0.28	341.370	5,909.75	-1.91	-62.79	35.27	0.41	0.07	-109.67	
6,008.00	0.40	331.590	6,004.75	-1.40	-63.02	35.82	0.14	0.13	-10.29	
6,134.00	0.67	327.990	6,130.74	-0.39	-63.62	36.99	0.22	0.21	-2.86	
6,387.00	0.80	329.320	6,383.72	2.39	-65.31	40.23	0.05	0.05	0.53	
6,481.00	1.21	328.870	6,477.71	3.80	-66.16	41.87	0.44	0.44	-0.48	
6,576.00	1.00	312.350	6,572.69	5.22	-67.29	43.68	0.40	-0.22	-17.39	
6,671.00	0.43	11.380	6,667.68	6.13	-67.83	44.74	0.91	-0.60	62.14	
6,765.00	0.69	125.700	6,761.68	6.14	-67.30	44.44	1.01	0.28	121.62	
6,860.00	1.28	153.780	6,856.67	4.86	-66.37	42.85	0.78	0.62	29.56	
6,955.00	1.57	196.160	6,951.64	2.65	-66.26	41.00	1.12	0.31	44.61	
7,049.00	3.00	257.950	7,045.57	0.90	-69.02	41.21	2.82	1.52	65.73	
7,144.00	4.44	281.280	7,140.38	1.10	-75.06	44.91	2.17	1.52	24.56	
7,428.00	9.00	300.440	7,422.38	14.52	-105.01	73.34	1.77	1.61	6.75	
7,523.00	9.40	302.870	7,516.16	22.49	-117.94	87.37	0.59	0.42	2.56	
7,618.00	10.08	305.660	7,609.79	31.55	-131.21	102.49	0.87	0.72	2.94	
7,713.00	11.29	305.650	7,703.14	41.82	-145.52	119.20	1.27	1.27	-0.01	
7,808.00	11.66	304.890	7,796.24	52.73	-160.95	137.09	0.42	0.39	-0.80	
7,902.00	12.45	303.460	7,888.17	63.75	-177.20	155.54	0.90	0.84	-1.52	
7,997.00	12.62	302.440	7,980.91	74.96	-194.50	174.77	0.29	0.18	-1.07	
8,092.00	11.69	304.350	8,073.77	85.96	-211.20	193.47	1.07	-0.98	2.01	
8,186.00	11.04	306.360	8,165.93	96.67	-226.31	211.01	0.81	-0.69	2.14	
8,281.00	11.51	306.220	8,259.10	107.66	-241.28	228.69	0.50	0.49	-0.15	
8,376.00	11.68	305.960	8,352.16	118.91	-256.71	246.85	0.19	0.18	-0.27	
8,471.00	13.12	307.910	8,444.94	131.18	-273.01	266.34	1.58	1.52	2.05	
8,565.00	13.88	308.740	8,536.34	144.79	-290.22	287.46	0.83	0.81	0.88	

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Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

Survey										
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8,660.00	14.34	309.810	8,628.48	159.45	-308.14	309.85	0.56	0.48	1.13	
8,755.00	14.64	309.390	8,720.45	174.60	-326.46	332.86	0.33	0.32	-0.44	
8,850.00	15.16	308.310	8,812.26	189.92	-345.48	356.43	0.62	0.55	-1.14	
8,945.00	15.80	307.180	8,903.81	205.44	-365.54	380.76	0.74	0.67	-1.19	
9,040.00	16.35	307.540	8,995.10	221.40	-386.44	405.95	0.59	0.58	0.38	
9,134.00	15.97	307.320	9,085.38	237.31	-407.22	431.01	0.41	-0.40	-0.23	
9,229.00	14.68	309.110	9,177.01	252.82	-426.95	455.15	1.45	-1.36	1.88	
9,324.00	14.03	308.970	9,269.04	267.66	-445.25	477.89	0.69	-0.68	-0.15	
9,419.00	13.25	306.420	9,361.36	281.36	-462.96	499.38	1.04	-0.82	-2.68	
9,514.00	13.76	306.660	9,453.73	294.57	-480.78	520.54	0.54	0.54	0.25	
9,608.00	14.02	308.320	9,544.98	308.31	-498.68	542.16	0.51	0.28	1.77	
9,703.00	13.57	308.070	9,637.24	322.32	-516.49	563.94	0.48	-0.47	-0.26	
9,798.00	13.80	308.290	9,729.55	336.21	-534.15	585.56	0.25	0.24	0.23	
9,872.00	14.59	311.680	9,801.29	347.88	-548.04	603.15	1.55	1.07	4.58	
9,919.00	14.07	311.240	9,846.83	355.58	-556.76	614.50	1.13	-1.11	-0.94	
9,966.00	11.34	304.730	9,892.67	361.98	-564.86	624.43	6.55	-5.81	-13.85	
10,014.00	9.05	300.600	9,939.91	366.59	-571.98	632.35	5.01	-4.77	-8.60	
10,061.00	6.46	284.520	9,986.48	369.14	-577.73	637.78	7.14	-5.51	-34.21	
10,108.00	6.02	251.560	10,033.22	369.02	-582.63	640.56	7.57	-0.94	-70.13	
10,155.00	6.42	279.160	10,079.95	368.66	-587.56	643.16	6.36	0.85	58.72	
10,203.00	7.60	284.340	10,127.59	369.87	-593.28	647.50	2.79	2.46	10.79	
10,250.00	10.73	291.020	10,173.99	372.21	-600.38	653.55	7.02	6.66	14.21	
10,297.00	13.98	297.180	10,219.90	376.37	-609.52	662.28	7.45	6.91	13.11	
10,344.00	16.66	300.870	10,265.22	382.43	-620.35	673.54	6.06	5.70	7.85	
10,391.00	18.20	308.160	10,310.07	390.42	-631.91	686.79	5.68	3.28	15.51	
10,438.00	21.76	313.350	10,354.24	400.94	-644.02	702.41	8.46	7.57	11.04	
10,486.00	24.75	315.020	10,398.33	414.16	-657.60	721.08	6.38	6.23	3.48	
10,533.00	27.56	318.180	10,440.52	429.22	-671.81	741.62	6.67	5.98	6.72	
10,581.00	30.81	322.050	10,482.42	447.20	-686.77	764.95	7.83	6.77	8.06	
10,628.00	33.98	323.890	10,522.10	467.31	-701.92	790.12	7.06	6.74	3.91	
10,675.00	36.66	323.190	10,560.45	489.15	-718.07	817.29	5.77	5.70	-1.49	
10,722.00	39.78	321.610	10,597.37	512.18	-735.82	846.35	6.96	6.64	-3.36	
10,770.00	42.81	320.640	10,633.43	536.83	-755.71	877.98	6.45	6.31	-2.02	
10,817.00	45.67	320.380	10,667.10	562.13	-776.56	910.70	6.10	6.09	-0.55	
10,865.00	49.54	321.260	10,699.46	589.61	-798.94	946.09	8.18	8.06	1.83	
10,912.00	53.14	321.700	10,728.81	618.32	-821.79	982.74	7.69	7.66	0.94	
10,960.00	56.70	322.580	10,756.40	649.34	-845.89	1,022.00	7.57	7.42	1.83	
11,007.00	60.26	323.370	10,780.96	681.32	-870.01	1,062.05	7.71	7.57	1.68	
11,054.00	62.99	323.190	10,803.30	714.46	-894.73	1,103.39	5.82	5.81	-0.38	
11,101.00	66.46	323.450	10,823.36	748.54	-920.11	1,145.88	7.40	7.38	0.55	
11,149.00	69.49	323.810	10,841.36	784.37	-946.50	1,190.37	6.35	6.31	0.75	
11,196.00	72.35	324.420	10,856.72	820.35	-972.53	1,234.78	6.21	6.09	1.30	
11,244.00	75.16	325.040	10,870.15	857.98	-999.13	1,280.86	5.98	5.85	1.29	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Aug1919_v14

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)	
11,291.00	76.31	324.860	10,881.73	895.27	-1,025.29	1,326.41	2.47	2.45	-0.38	
11,338.00	78.20	325.210	10,892.10	932.83	-1,051.56	1,372.24	4.09	4.02	0.74	
11,385.00	80.40	324.770	10,900.82	970.65	-1,078.06	1,418.41	4.77	4.68	-0.94	
11,433.00	83.65	326.180	10,907.48	1,009.81	-1,104.99	1,465.93	7.37	6.77	2.94	
11,480.00	87.78	328.200	10,911.00	1,049.20	-1,130.38	1,512.72	9.78	8.79	4.30	
11,528.00	89.49	329.170	10,912.14	1,090.19	-1,155.32	1,560.55	4.10	3.56	2.02	
11,623.00	91.74	329.080	10,911.12	1,171.72	-1,204.06	1,655.17	2.37	2.37	-0.09	
11,717.00	92.13	328.990	10,907.95	1,252.27	-1,252.40	1,748.77	0.43	0.41	-0.10	
11,812.00	90.95	328.820	10,905.39	1,333.59	-1,301.45	1,843.40	1.25	-1.24	-0.18	
11,907.00	90.86	329.520	10,903.89	1,415.16	-1,350.13	1,938.01	0.74	-0.09	0.74	
12,001.00	90.07	327.850	10,903.13	1,495.46	-1,398.98	2,031.71	1.97	-0.84	-1.78	
12,096.00	89.58	327.590	10,903.42	1,575.78	-1,449.71	2,126.52	0.58	-0.52	-0.27	
12,191.00	89.27	327.410	10,904.37	1,655.89	-1,500.75	2,221.34	0.38	-0.33	-0.19	
12,286.00	90.37	327.150	10,904.67	1,735.82	-1,552.10	2,316.19	1.19	1.16	-0.27	
12,381.00	89.98	326.620	10,904.38	1,815.39	-1,604.00	2,411.08	0.69	-0.41	-0.56	
12,475.00	89.80	326.710	10,904.56	1,893.92	-1,655.66	2,504.99	0.21	-0.19	0.10	
12,570.00	89.41	326.180	10,905.22	1,973.09	-1,708.17	2,599.91	0.69	-0.41	-0.56	
12,665.00	90.95	326.880	10,904.92	2,052.33	-1,760.56	2,694.82	1.78	1.62	0.74	
12,759.00	91.03	328.020	10,903.29	2,131.55	-1,811.13	2,788.64	1.22	0.09	1.21	
12,854.00	90.99	327.850	10,901.62	2,212.05	-1,861.55	2,883.41	0.18	-0.04	-0.18	
12,949.00	90.81	327.150	10,900.13	2,292.16	-1,912.59	2,978.23	0.76	-0.19	-0.74	
13,043.00	90.64	326.970	10,898.94	2,371.04	-1,963.70	3,072.10	0.26	-0.18	-0.19	
13,138.00	90.81	327.940	10,897.73	2,451.12	-2,014.80	3,166.93	1.04	0.18	1.02	
13,233.00	92.22	328.460	10,895.22	2,531.82	-2,064.84	3,261.65	1.58	1.48	0.55	
13,327.00	91.82	328.730	10,891.91	2,612.00	-2,113.79	3,355.30	0.51	-0.43	0.29	
13,422.00	91.60	328.900	10,889.08	2,693.24	-2,162.96	3,449.94	0.29	-0.23	0.18	
13,517.00	91.03	327.230	10,886.89	2,773.84	-2,213.20	3,544.68	1.86	-0.60	-1.76	
13,612.00	90.29	325.920	10,885.80	2,853.12	-2,265.52	3,639.58	1.58	-0.78	-1.38	
13,706.00	90.11	326.090	10,885.47	2,931.05	-2,318.08	3,733.53	0.26	-0.19	0.18	
13,801.00	89.89	326.440	10,885.47	3,010.05	-2,370.84	3,828.46	0.44	-0.23	0.37	
13,896.00	89.71	326.000	10,885.80	3,089.02	-2,423.66	3,923.40	0.50	-0.19	-0.46	
13,991.00	90.77	326.270	10,885.41	3,167.90	-2,476.59	4,018.34	1.15	1.12	0.28	
14,086.00	90.55	326.000	10,884.31	3,246.78	-2,529.53	4,113.27	0.37	-0.23	-0.28	
14,181.00	90.90	327.410	10,883.11	3,326.17	-2,581.67	4,208.16	1.53	0.37	1.48	
14,275.00	90.99	326.790	10,881.56	3,405.09	-2,632.72	4,302.02	0.67	0.10	-0.66	
14,370.00	90.86	325.560	10,880.03	3,483.99	-2,685.60	4,396.94	1.30	-0.14	-1.29	
14,465.00	90.77	324.600	10,878.67	3,561.88	-2,739.97	4,491.92	1.01	-0.09	-1.01	
14,560.00	90.42	325.740	10,877.69	3,639.86	-2,794.23	4,586.89	1.26	-0.37	1.20	
14,654.00	91.56	327.230	10,876.06	3,718.21	-2,846.12	4,680.79	2.00	1.21	1.59	
14,749.00	91.38	326.620	10,873.63	3,797.79	-2,897.95	4,775.65	0.67	-0.19	-0.64	
14,844.00	91.30	325.920	10,871.40	3,876.78	-2,950.69	4,870.55	0.74	-0.08	-0.74	
14,939.00	90.95	328.200	10,869.54	3,956.49	-3,002.33	4,965.40	2.43	-0.37	2.40	
15,033.00	91.12	328.290	10,867.84	4,036.40	-3,051.79	5,059.14	0.20	0.18	0.10	
15,128.00	90.68	327.320	10,866.35	4,116.78	-3,102.40	5,153.93	1.12	-0.46	-1.02	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	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)
15,223.00	90.77	327.410	10,865.15	4,196.78	-3,153.63	5,248.77	0.13	0.09	0.09
15,318.00	90.51	327.320	10,864.09	4,276.77	-3,204.86	5,343.61	0.29	-0.27	-0.09
15,412.00	89.98	326.790	10,863.68	4,355.66	-3,255.98	5,437.48	0.80	-0.56	-0.56
15,507.00	91.12	328.200	10,862.77	4,435.77	-3,307.02	5,532.30	1.91	1.20	1.48
15,602.00	91.38	328.900	10,860.70	4,516.79	-3,356.58	5,627.00	0.79	0.27	0.74
15,700.00	91.47	328.380	10,858.26	4,600.45	-3,407.56	5,724.66	0.54	0.09	-0.53
15,795.00	91.21	327.670	10,856.04	4,681.01	-3,457.86	5,819.41	0.80	-0.27	-0.75
15,889.00	90.68	327.150	10,854.49	4,760.20	-3,508.48	5,913.24	0.79	-0.56	-0.55
15,984.00	91.34	327.230	10,852.82	4,840.03	-3,559.95	6,008.08	0.70	0.69	0.08
16,079.00	90.99	326.710	10,850.88	4,919.66	-3,611.72	6,102.94	0.66	-0.37	-0.55
16,174.00	91.47	328.730	10,848.84	4,999.96	-3,662.44	6,197.73	2.19	0.51	2.13
16,268.00	90.90	327.670	10,846.90	5,079.83	-3,711.96	6,291.47	1.28	-0.61	-1.13
16,363.00	91.03	327.320	10,845.30	5,159.94	-3,763.01	6,386.29	0.39	0.14	-0.37
16,458.00	90.42	327.670	10,844.10	5,240.05	-3,814.05	6,481.11	0.74	-0.64	0.37
16,552.00	90.02	327.940	10,843.74	5,319.59	-3,864.13	6,574.91	0.51	-0.43	0.29
16,647.00	89.67	327.850	10,843.99	5,400.06	-3,914.62	6,669.70	0.38	-0.37	-0.09
16,670.00	89.54	327.500	10,844.15	5,419.50	-3,926.92	6,692.66	1.62	-0.57	-1.52
Survey @ 16670.00 MD 10844.15 TVD									
16,723.00	89.54	327.500	10,844.58	5,464.20	-3,955.40	6,745.56	0.00	0.00	0.00
Survey projected to 16723.00 MD 10844.58 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
248.00	248.00	-0.35	0.01	MWD surveys
16,670.00	10,844.15	5,419.50	-3,926.92	Survey @ 16670.00 MD 10844.15 TVD
16,723.00	10,844.58	5,464.20	-3,955.40	Survey projected to 16723.00 MD 10844.58 TVD

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	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-06HU (I)					
Well Position	+N/-S	0.00 ft	Northing:	14,455,058.55 usft	Latitude:	39.80298702
	+E/-W	0.00 ft	Easting:	1,697,245.51 usft	Longitude:	-80.79765714
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	8/18/2020	-8.730	66.715	51,827.09899205

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	324.100	

Survey Program	Date	9/5/2020			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
248.00	823.00	MWD surf (Original Hole)	MWD	MWD - Standard	
889.00	2,588.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,689.00	9,798.00	MWD (Original Hole)	MWD	MWD - Standard	
9,872.00	16,670.00	MWD lat (Original Hole)	MWD	MWD - Standard	
16,723.00	16,723.00	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	14,455,058.55	1,697,245.51	39.80298702	-80.79765714
248.00	0.16	178.920	248.00	-0.35	0.01	14,455,058.20	1,697,245.52	39.80298607	-80.79765712
MWD surveys									
295.00	0.39	105.890	295.00	-0.46	0.16	14,455,058.09	1,697,245.67	39.80298577	-80.79765657
338.00	0.18	115.270	338.00	-0.52	0.36	14,455,058.03	1,697,245.88	39.80298558	-80.79765585
385.00	0.14	90.850	385.00	-0.56	0.49	14,455,057.99	1,697,246.00	39.80298549	-80.79765541
429.00	0.17	317.030	429.00	-0.51	0.50	14,455,058.04	1,697,246.01	39.80298562	-80.79765538
476.00	0.06	222.430	476.00	-0.48	0.43	14,455,058.07	1,697,245.94	39.80298571	-80.79765560

08/27/2021

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	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
520.00	0.08	245.510	520.00	-0.51	0.39	14,455,058.04	1,697,245.90	39.80298563	-80.79765576
567.00	0.09	216.360	567.00	-0.55	0.34	14,455,058.00	1,697,245.85	39.80298551	-80.79765594
612.00	0.25	25.620	612.00	-0.49	0.36	14,455,058.06	1,697,245.87	39.80298567	-80.79765587
646.00	0.31	328.840	646.00	-0.34	0.34	14,455,058.21	1,697,245.86	39.80298607	-80.79765592
702.00	0.40	357.070	702.00	-0.02	0.26	14,455,058.53	1,697,245.77	39.80298697	-80.79765623
749.00	0.18	307.390	749.00	0.19	0.19	14,455,058.74	1,697,245.70	39.80298754	-80.79765647
793.00	0.35	33.860	793.00	0.34	0.21	14,455,058.89	1,697,245.72	39.80298796	-80.79765640
823.00	0.28	53.600	823.00	0.46	0.32	14,455,059.01	1,697,245.83	39.80298829	-80.79765600
889.00	0.07	32.700	889.00	0.59	0.47	14,455,059.14	1,697,245.98	39.80298864	-80.79765546
984.00	0.13	136.630	983.99	0.56	0.58	14,455,059.11	1,697,246.09	39.80298856	-80.79765509
1,078.00	0.15	163.450	1,077.99	0.37	0.68	14,455,058.92	1,697,246.20	39.80298803	-80.79765471
1,173.00	0.39	165.850	1,172.99	-0.07	0.80	14,455,058.48	1,697,246.31	39.80298684	-80.79765430
1,268.00	0.45	237.980	1,267.99	-0.58	0.56	14,455,057.97	1,697,246.07	39.80298543	-80.79765515
1,363.00	0.79	264.070	1,362.99	-0.84	-0.41	14,455,057.71	1,697,245.11	39.80298471	-80.79765860
1,457.00	0.92	277.960	1,456.98	-0.81	-1.80	14,455,057.75	1,697,243.71	39.80298482	-80.79766355
1,552.00	1.91	294.490	1,551.95	-0.04	-4.00	14,455,058.51	1,697,241.52	39.80298693	-80.79767137
1,647.00	2.95	291.570	1,646.86	1.51	-7.71	14,455,060.06	1,697,237.80	39.80299122	-80.79768458
1,742.00	3.56	291.870	1,741.71	3.51	-12.72	14,455,062.06	1,697,232.79	39.80299674	-80.79770240
1,836.00	3.67	290.670	1,835.52	5.66	-18.24	14,455,064.21	1,697,227.27	39.80300267	-80.79772205
1,931.00	3.75	281.960	1,930.32	7.38	-24.13	14,455,065.93	1,697,221.39	39.80300743	-80.79774299
2,026.00	4.39	268.810	2,025.08	7.94	-30.80	14,455,066.49	1,697,214.71	39.80300903	-80.79776675
2,121.00	4.16	248.860	2,119.82	6.63	-37.65	14,455,065.18	1,697,207.86	39.80300545	-80.79779115
2,215.00	3.81	251.210	2,213.60	4.39	-43.79	14,455,062.94	1,697,201.72	39.80299935	-80.79781301
2,310.00	3.75	266.410	2,308.39	3.18	-49.88	14,455,061.73	1,697,195.64	39.80299606	-80.79783470
2,405.00	3.29	266.730	2,403.21	2.83	-55.70	14,455,061.38	1,697,189.81	39.80299514	-80.79785544
2,500.00	3.38	262.270	2,498.05	2.30	-61.20	14,455,060.85	1,697,184.32	39.80299371	-80.79787501
2,588.00	3.44	261.690	2,585.90	1.57	-66.38	14,455,060.12	1,697,179.13	39.80299173	-80.79789347
2,689.00	5.10	259.670	2,686.61	0.32	-73.79	14,455,058.87	1,697,171.72	39.80298837	-80.79791988
2,783.00	3.35	261.230	2,780.35	-0.85	-80.62	14,455,057.71	1,697,164.89	39.80298520	-80.79794419
2,878.00	1.60	270.800	2,875.26	-1.25	-84.69	14,455,057.30	1,697,160.82	39.80298411	-80.79795869
2,973.00	0.71	317.110	2,970.24	-0.80	-86.42	14,455,057.75	1,697,159.10	39.80298536	-80.79796483
3,067.00	0.89	29.370	3,064.23	0.26	-86.45	14,455,058.81	1,697,159.06	39.80298828	-80.79796496
3,162.00	1.50	51.990	3,159.21	1.67	-85.11	14,455,060.22	1,697,160.40	39.80299214	-80.79796017
3,257.00	1.62	82.120	3,254.18	2.62	-82.80	14,455,061.17	1,697,162.71	39.80299473	-80.79795194
3,352.00	1.36	107.320	3,349.15	2.47	-80.40	14,455,061.02	1,697,165.12	39.80299430	-80.79794337
3,446.00	0.91	111.460	3,443.13	1.86	-78.64	14,455,060.42	1,697,166.88	39.80299263	-80.79793711
3,541.00	0.98	116.990	3,538.12	1.22	-77.21	14,455,059.77	1,697,168.30	39.80299085	-80.79793204
3,636.00	1.23	120.130	3,633.10	0.34	-75.60	14,455,058.89	1,697,169.91	39.80298842	-80.79792633
3,731.00	1.34	132.620	3,728.08	-0.92	-73.91	14,455,057.63	1,697,171.61	39.80298494	-80.79792029
3,825.00	1.02	144.320	3,822.06	-2.35	-72.61	14,455,056.20	1,697,172.90	39.80298102	-80.79791568
3,920.00	0.26	135.660	3,917.05	-3.19	-71.96	14,455,055.36	1,697,173.55	39.80297871	-80.79791340
4,015.00	0.08	119.900	4,012.05	-3.38	-71.76	14,455,055.17	1,697,173.76	39.80297819	-80.79791266
4,110.00	0.28	198.070	4,107.05	-3.63	-71.77	14,455,054.92	1,697,173.74	39.80297750	-80.79791271
4,205.00	0.87	202.140	4,202.04	-4.52	-72.11	14,455,054.03	1,697,173.40	39.80297506	-80.79791394
4,299.00	1.62	198.110	4,296.02	-6.44	-72.80	14,455,052.11	1,697,172.72	39.80296978	-80.79791639
4,394.00	1.85	216.920	4,390.98	-8.95	-74.14	14,455,049.61	1,697,171.38	39.80296292	-80.79792117
4,489.00	1.33	233.360	4,485.94	-10.83	-75.94	14,455,047.72	1,697,169.57	39.80295775	-80.79792762
4,583.00	0.57	244.560	4,579.93	-11.68	-77.24	14,455,046.87	1,697,168.27	39.80295542	-80.79793225
4,678.00	0.44	88.120	4,674.93	-11.87	-77.30	14,455,046.68	1,697,168.21	39.80295490	-80.79793247
4,773.00	0.92	72.420	4,769.92	-11.63	-76.21	14,455,046.92	1,697,169.30	39.80295556	-80.79792858
4,867.00	1.05	71.210	4,863.91	-11.12	-74.67	14,455,047.43	1,697,170.84	39.80295693	-80.79792311
4,962.00	0.72	64.430	4,958.89	-10.59	-73.31	14,455,047.96	1,697,172.20	39.80295840	-80.79791826
5,060.00	0.82	25.880	5,056.89	-9.69	-72.45	14,455,048.86	1,697,173.06	39.80296086	-80.79791518
5,155.00	1.22	26.210	5,151.87	-8.17	-71.71	14,455,050.38	1,697,173.81	39.80296503	-80.79791252
5,249.00	1.71	30.530	5,245.84	-6.07	-70.55	14,455,052.49	1,697,174.96	39.80297080	-80.79790839

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	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
5,344.00	1.16	43.610	5,340.81	-4.15	-69.17	14,455,054.40	1,697,176.34	39.80297606	-80.79790345
5,439.00	1.15	65.430	5,435.79	-3.06	-67.64	14,455,055.50	1,697,177.87	39.80297905	-80.79789800
5,534.00	1.12	50.330	5,530.77	-2.07	-66.06	14,455,056.48	1,697,179.46	39.80298176	-80.79789236
5,629.00	0.74	90.540	5,625.76	-1.48	-64.73	14,455,057.07	1,697,180.78	39.80298336	-80.79788762
5,723.00	0.76	122.400	5,719.75	-1.82	-63.60	14,455,056.73	1,697,181.92	39.80298242	-80.79788359
5,818.00	0.21	85.560	5,814.75	-2.14	-62.89	14,455,056.41	1,697,182.62	39.80298153	-80.79788108
5,913.00	0.28	341.370	5,909.75	-1.91	-62.79	14,455,056.64	1,697,182.72	39.80298217	-80.79788073
6,008.00	0.40	331.590	6,004.75	-1.40	-63.02	14,455,057.15	1,697,182.49	39.80298357	-80.79788155
6,134.00	0.67	327.990	6,130.74	-0.39	-63.62	14,455,058.16	1,697,181.89	39.80298636	-80.79788367
6,387.00	0.80	329.320	6,383.72	2.39	-65.31	14,455,060.94	1,697,180.20	39.80299398	-80.79788965
6,481.00	1.21	328.870	6,477.71	3.80	-66.16	14,455,062.35	1,697,179.36	39.80299787	-80.79789266
6,576.00	1.00	312.350	6,572.69	5.22	-67.29	14,455,063.77	1,697,178.23	39.80300177	-80.79789668
6,671.00	0.43	11.380	6,667.68	6.13	-67.83	14,455,064.68	1,697,177.68	39.80300427	-80.79789860
6,765.00	0.69	125.700	6,761.68	6.14	-67.30	14,455,064.69	1,697,178.21	39.80300431	-80.79789672
6,860.00	1.28	153.780	6,856.67	4.86	-66.37	14,455,063.41	1,697,179.15	39.80300077	-80.79789340
6,955.00	1.57	196.160	6,951.64	2.65	-66.26	14,455,061.20	1,697,179.25	39.80299472	-80.79789304
7,049.00	3.00	257.950	7,045.57	0.90	-69.02	14,455,059.45	1,697,176.49	39.80298993	-80.79790290
7,144.00	4.44	281.280	7,140.38	1.10	-75.06	14,455,059.65	1,697,170.45	39.80299052	-80.79792440
7,428.00	9.00	300.440	7,422.38	14.52	-105.01	14,455,073.07	1,697,140.50	39.80302754	-80.79803093
7,523.00	9.40	302.870	7,516.16	22.49	-117.94	14,455,081.04	1,697,127.58	39.80304952	-80.79807688
7,618.00	10.08	305.660	7,609.79	31.55	-131.21	14,455,090.10	1,697,114.31	39.80307448	-80.79812406
7,713.00	11.29	305.650	7,703.14	41.82	-145.52	14,455,100.37	1,697,099.99	39.80310276	-80.79817493
7,808.00	11.66	304.890	7,796.24	52.73	-160.95	14,455,111.28	1,697,084.56	39.80313282	-80.79822979
7,902.00	12.45	303.460	7,888.17	63.75	-177.20	14,455,122.30	1,697,068.32	39.80316319	-80.79828754
7,997.00	12.62	302.440	7,980.91	74.96	-194.50	14,455,133.51	1,697,051.02	39.80319409	-80.79834905
8,092.00	11.69	304.350	8,073.77	85.96	-211.20	14,455,144.51	1,697,034.31	39.80322439	-80.79840844
8,186.00	11.04	306.360	8,165.93	96.67	-226.31	14,455,155.22	1,697,019.20	39.80325390	-80.79846216
8,281.00	11.51	306.220	8,259.10	107.66	-241.28	14,455,166.21	1,697,004.23	39.80328418	-80.79851538
8,376.00	11.68	305.960	8,352.16	118.91	-256.71	14,455,177.46	1,696,988.80	39.80331516	-80.79857023
8,471.00	13.12	307.910	8,444.94	131.18	-273.01	14,455,189.73	1,696,972.51	39.80334897	-80.79862814
8,565.00	13.88	308.740	8,536.34	144.79	-290.22	14,455,203.34	1,696,955.30	39.80338645	-80.79868931
8,660.00	14.34	309.810	8,628.48	159.45	-308.14	14,455,218.00	1,696,937.37	39.80342683	-80.79875302
8,755.00	14.64	309.390	8,720.45	174.60	-326.46	14,455,233.15	1,696,919.05	39.80346855	-80.79881811
8,850.00	15.16	308.310	8,812.26	189.92	-345.48	14,455,248.47	1,696,900.03	39.80351074	-80.79888573
8,945.00	15.80	307.180	8,903.81	205.44	-365.54	14,455,263.99	1,696,879.98	39.80355348	-80.79895700
9,040.00	16.35	307.540	8,995.10	221.40	-386.44	14,455,279.95	1,696,859.07	39.80359745	-80.79903131
9,134.00	15.97	307.320	9,085.38	237.31	-407.22	14,455,295.86	1,696,838.30	39.80364125	-80.79910516
9,229.00	14.68	309.110	9,177.01	252.82	-426.95	14,455,311.37	1,696,818.56	39.80368398	-80.79917530
9,324.00	14.03	308.970	9,269.04	267.66	-445.25	14,455,326.21	1,696,800.27	39.80372484	-80.79924032
9,419.00	13.25	306.420	9,361.36	281.36	-462.96	14,455,339.91	1,696,782.55	39.80376259	-80.79930328
9,514.00	13.76	306.660	9,453.73	294.57	-480.78	14,455,353.12	1,696,764.73	39.80379897	-80.79936664
9,608.00	14.02	308.320	9,544.98	308.31	-498.68	14,455,366.86	1,696,746.83	39.80383680	-80.79943027
9,703.00	13.57	308.070	9,637.24	322.32	-516.49	14,455,380.87	1,696,729.03	39.80387538	-80.79949354
9,798.00	13.80	308.290	9,729.55	336.21	-534.15	14,455,394.76	1,696,711.36	39.80391364	-80.79955634
9,872.00	14.59	311.680	9,801.29	347.88	-548.04	14,455,406.43	1,696,697.47	39.80394577	-80.79960570
9,919.00	14.07	311.240	9,846.83	355.58	-556.76	14,455,414.13	1,696,688.75	39.80396698	-80.79963667
9,966.00	11.34	304.730	9,892.67	361.98	-564.86	14,455,420.53	1,696,680.66	39.80398460	-80.79966545
10,014.00	9.05	300.600	9,939.91	366.59	-571.98	14,455,425.14	1,696,673.53	39.80399731	-80.79969079
10,061.00	6.46	284.520	9,986.48	369.14	-577.73	14,455,427.69	1,696,667.79	39.80400433	-80.79971122
10,108.00	6.02	251.560	10,033.22	369.02	-582.63	14,455,427.57	1,696,662.89	39.80400404	-80.79972866
10,155.00	6.42	279.160	10,079.95	368.66	-587.56	14,455,427.21	1,696,657.95	39.80400308	-80.79974623
10,203.00	7.60	284.340	10,127.59	369.87	-593.28	14,455,428.42	1,696,652.23	39.80400645	-80.79976661
10,250.00	10.73	291.020	10,173.99	372.21	-600.38	14,455,430.76	1,696,645.13	39.80401292	-80.79979186
10,297.00	13.98	297.180	10,219.90	376.37	-609.52	14,455,434.92	1,696,635.99	39.80402441	-80.79982436
10,344.00	16.66	300.870	10,265.22	382.43	-620.35	14,455,440.98	1,696,625.16	39.80404110	-80.79986289

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	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
10,391.00	18.20	308.160	10,310.07	390.42	-631.91	14,455,448.97	1,696,613.60	39.80406312	-80.79990398
10,438.00	21.76	313.350	10,354.24	400.94	-644.02	14,455,459.49	1,696,601.49	39.80409208	-80.79994701
10,486.00	24.75	315.020	10,398.33	414.16	-657.60	14,455,472.71	1,696,587.92	39.80412847	-80.79999525
10,533.00	27.56	318.180	10,440.52	429.22	-671.81	14,455,487.77	1,696,573.71	39.80416993	-80.80004572
10,581.00	30.81	322.050	10,482.42	447.20	-686.77	14,455,505.75	1,696,558.74	39.80421938	-80.80009887
10,628.00	33.98	323.890	10,522.10	467.31	-701.92	14,455,525.86	1,696,543.59	39.80427470	-80.80015264
10,675.00	36.66	323.190	10,560.45	489.15	-718.07	14,455,547.70	1,696,527.44	39.80433480	-80.80020998
10,722.00	39.78	321.610	10,597.37	512.18	-735.82	14,455,570.73	1,696,509.69	39.80439814	-80.80027299
10,770.00	42.81	320.640	10,633.43	536.83	-755.71	14,455,595.38	1,696,489.81	39.80446597	-80.80034360
10,817.00	45.67	320.380	10,667.10	562.13	-776.56	14,455,620.68	1,696,468.96	39.80453558	-80.80041764
10,865.00	49.54	321.260	10,699.46	589.61	-798.94	14,455,648.16	1,696,446.57	39.80461118	-80.80049712
10,912.00	53.14	321.700	10,728.81	618.32	-821.79	14,455,676.87	1,696,423.72	39.80469017	-80.80057826
10,960.00	56.70	322.580	10,756.40	649.34	-845.89	14,455,707.88	1,696,399.62	39.80477548	-80.80066382
11,007.00	60.26	323.370	10,780.96	681.32	-870.01	14,455,739.87	1,696,375.51	39.80486347	-80.80074944
11,054.00	62.99	323.190	10,803.30	714.46	-894.73	14,455,773.01	1,696,350.78	39.80495464	-80.80083721
11,101.00	66.46	323.450	10,823.36	748.54	-920.11	14,455,807.09	1,696,325.40	39.80504839	-80.80092731
11,149.00	69.49	323.810	10,841.36	784.37	-946.50	14,455,842.92	1,696,299.02	39.80514694	-80.80102097
11,196.00	72.35	324.420	10,856.72	820.35	-972.53	14,455,878.90	1,696,272.99	39.80524592	-80.80111337
11,244.00	75.16	325.040	10,870.15	857.98	-999.13	14,455,916.52	1,696,246.38	39.80534940	-80.80120781
11,291.00	76.31	324.860	10,881.73	895.27	-1,025.29	14,455,953.81	1,696,220.22	39.80545197	-80.80130066
11,338.00	78.20	325.210	10,892.10	932.83	-1,051.56	14,455,991.38	1,696,193.95	39.80555529	-80.80139390
11,385.00	80.40	324.770	10,900.82	970.65	-1,078.06	14,456,029.20	1,696,167.46	39.80565933	-80.80148794
11,433.00	83.65	326.180	10,907.48	1,009.81	-1,104.99	14,456,068.36	1,696,140.52	39.80576703	-80.80158354
11,480.00	87.78	328.200	10,911.00	1,049.20	-1,130.38	14,456,107.74	1,696,115.13	39.80587534	-80.80167362
11,528.00	89.49	329.170	10,912.14	1,090.19	-1,155.32	14,456,148.74	1,696,090.20	39.80598807	-80.80176210
11,623.00	91.74	329.080	10,911.12	1,171.72	-1,204.06	14,456,230.27	1,696,041.45	39.80621226	-80.80193502
11,717.00	92.13	328.990	10,907.95	1,252.27	-1,252.40	14,456,310.82	1,695,993.11	39.80643379	-80.80210650
11,812.00	90.95	328.820	10,905.39	1,333.59	-1,301.45	14,456,392.14	1,695,944.07	39.80665741	-80.80228050
11,907.00	90.86	329.520	10,903.89	1,415.16	-1,350.13	14,456,473.71	1,695,895.39	39.80688170	-80.80245319
12,001.00	90.07	327.850	10,903.13	1,495.46	-1,398.98	14,456,554.01	1,695,846.54	39.80710253	-80.80262651
12,096.00	89.58	327.590	10,903.42	1,575.78	-1,449.71	14,456,634.32	1,695,795.80	39.80732340	-80.80280654
12,191.00	89.27	327.410	10,904.37	1,655.89	-1,500.75	14,456,714.44	1,695,744.76	39.80754374	-80.80298765
12,286.00	90.37	327.150	10,904.67	1,735.82	-1,552.10	14,456,794.36	1,695,693.41	39.80776354	-80.80316987
12,381.00	89.98	326.620	10,904.38	1,815.39	-1,604.00	14,456,873.93	1,695,641.51	39.80798237	-80.80335406
12,475.00	89.80	326.710	10,904.56	1,893.92	-1,655.66	14,456,952.47	1,695,589.86	39.80819836	-80.80353738
12,570.00	89.41	326.180	10,905.22	1,973.09	-1,708.17	14,457,031.63	1,695,537.35	39.80841609	-80.80372373
12,665.00	90.95	326.880	10,904.92	2,052.33	-1,760.56	14,457,110.88	1,695,484.96	39.80863402	-80.80390967
12,759.00	91.03	328.020	10,903.29	2,131.55	-1,811.13	14,457,190.10	1,695,434.39	39.80885189	-80.80408911
12,854.00	90.99	327.850	10,901.62	2,212.05	-1,861.55	14,457,270.59	1,695,383.96	39.80907325	-80.80426804
12,949.00	90.81	327.150	10,900.13	2,292.16	-1,912.59	14,457,350.70	1,695,332.93	39.80929357	-80.80444915
13,043.00	90.64	326.970	10,898.94	2,371.04	-1,963.70	14,457,429.59	1,695,281.82	39.80951051	-80.80463053
13,138.00	90.81	327.940	10,897.73	2,451.12	-2,014.80	14,457,509.66	1,695,230.72	39.80973072	-80.80481188
13,233.00	92.22	328.460	10,895.22	2,531.82	-2,064.84	14,457,590.37	1,695,180.68	39.80995267	-80.80498944
13,327.00	91.82	328.730	10,891.91	2,612.00	-2,113.79	14,457,670.55	1,695,131.72	39.81017315	-80.80516313
13,422.00	91.60	328.900	10,889.08	2,693.24	-2,162.96	14,457,751.79	1,695,082.56	39.81039654	-80.80533759
13,517.00	91.03	327.230	10,886.89	2,773.84	-2,213.20	14,457,832.38	1,695,032.32	39.81061818	-80.80551585
13,612.00	90.29	325.920	10,885.80	2,853.12	-2,265.52	14,457,911.66	1,694,979.99	39.81083622	-80.80570157
13,706.00	90.11	326.090	10,885.47	2,931.05	-2,318.08	14,457,989.60	1,694,927.44	39.81105056	-80.80588812
13,801.00	89.89	326.440	10,885.47	3,010.05	-2,370.84	14,458,068.60	1,694,874.68	39.81126784	-80.80607538
13,896.00	89.71	326.000	10,885.80	3,089.02	-2,423.66	14,458,147.56	1,694,821.86	39.81148500	-80.80626286
13,991.00	90.77	326.270	10,885.41	3,167.90	-2,476.59	14,458,226.44	1,694,768.92	39.81170194	-80.80645076
14,086.00	90.55	326.000	10,884.31	3,246.78	-2,529.53	14,458,305.32	1,694,715.99	39.81191888	-80.80663865
14,181.00	90.90	327.410	10,883.11	3,326.17	-2,581.67	14,458,384.72	1,694,663.84	39.81213723	-80.80682373
14,275.00	90.99	326.790	10,881.56	3,405.09	-2,632.72	14,458,463.63	1,694,612.79	39.81235425	-80.80700491
14,370.00	90.86	325.560	10,880.03	3,483.99	-2,685.60	14,458,542.54	1,694,559.92	39.81257127	-80.80719260

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Michter N-06HU (I)
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-06HU (I)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	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
14,465.00	90.77	324.600	10,878.67	3,561.88	-2,739.97	14,458,620.42	1,694,505.54	39.81278549	-80.80738563
14,560.00	90.42	325.740	10,877.69	3,639.86	-2,794.23	14,458,698.40	1,694,451.29	39.81299995	-80.80757824
14,654.00	91.56	327.230	10,876.06	3,718.21	-2,846.12	14,458,776.76	1,694,399.40	39.81321544	-80.80776243
14,749.00	91.38	326.620	10,873.63	3,797.79	-2,897.95	14,458,856.34	1,694,347.57	39.81343429	-80.80794638
14,844.00	91.30	325.920	10,871.40	3,876.78	-2,950.69	14,458,935.32	1,694,294.83	39.81365152	-80.80813358
14,939.00	90.95	328.200	10,869.54	3,956.49	-3,002.33	14,459,015.03	1,694,243.19	39.81387072	-80.80831688
15,033.00	91.12	328.290	10,867.84	4,036.40	-3,051.79	14,459,094.94	1,694,193.73	39.81409048	-80.80849241
15,128.00	90.68	327.320	10,866.35	4,116.78	-3,102.40	14,459,175.33	1,694,143.12	39.81431153	-80.80867203
15,223.00	90.77	327.410	10,865.15	4,196.78	-3,153.63	14,459,255.32	1,694,091.89	39.81453152	-80.80885385
15,318.00	90.51	327.320	10,864.09	4,276.77	-3,204.86	14,459,335.32	1,694,040.66	39.81475151	-80.80903567
15,412.00	89.98	326.790	10,863.68	4,355.66	-3,255.98	14,459,414.20	1,693,989.54	39.81496844	-80.80921712
15,507.00	91.12	328.200	10,862.77	4,435.77	-3,307.02	14,459,494.31	1,693,938.49	39.81518874	-80.80939829
15,602.00	91.38	328.900	10,860.70	4,516.79	-3,356.58	14,459,575.33	1,693,888.94	39.81541155	-80.80957415
15,700.00	91.47	328.380	10,858.26	4,600.45	-3,407.56	14,459,658.99	1,693,837.96	39.81564159	-80.80975508
15,795.00	91.21	327.670	10,856.04	4,681.01	-3,457.86	14,459,739.55	1,693,787.66	39.81586313	-80.80993358
15,889.00	90.68	327.150	10,854.49	4,760.20	-3,508.48	14,459,818.74	1,693,737.04	39.81608090	-80.81011326
15,984.00	91.34	327.230	10,852.82	4,840.03	-3,559.95	14,459,898.57	1,693,685.57	39.81630044	-80.81029595
16,079.00	90.99	326.710	10,850.88	4,919.66	-3,611.72	14,459,978.20	1,693,633.80	39.81651942	-80.81047972
16,174.00	91.47	328.730	10,848.84	4,999.96	-3,662.44	14,460,058.50	1,693,583.08	39.81674023	-80.81065974
16,268.00	90.90	327.670	10,846.90	5,079.83	-3,711.96	14,460,138.37	1,693,533.56	39.81695986	-80.81083550
16,363.00	91.03	327.320	10,845.30	5,159.94	-3,763.01	14,460,218.48	1,693,482.51	39.81718015	-80.81101668
16,458.00	90.42	327.670	10,844.10	5,240.05	-3,814.05	14,460,298.59	1,693,431.47	39.81740045	-80.81119786
16,552.00	90.02	327.940	10,843.74	5,319.59	-3,864.13	14,460,378.13	1,693,381.39	39.81761920	-80.81137563
16,647.00	89.67	327.850	10,843.99	5,400.06	-3,914.62	14,460,458.60	1,693,330.90	39.81784049	-80.81155483
16,670.00	89.54	327.500	10,844.15	5,419.50	-3,926.92	14,460,478.04	1,693,318.60	39.81789393	-80.81159848
Survey @ 16670.00 MD 10844.15 TVD									
16,723.00	89.54	327.500	10,844.58	5,464.20	-3,955.40	14,460,522.74	1,693,290.12	39.81801685	-80.81169956
Survey projected to 16723.00 MD 10844.58 TVD									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
248.00	248.00	-0.35	0.01	MWD surveys
16,670.00	10,844.15	5,419.50	-3,926.92	Survey @ 16670.00 MD 10844.15 TVD
16,723.00	10,844.58	5,464.20	-3,955.40	Survey projected to 16723.00 MD 10844.58 TVD