



Well: Fitzgerald 17 HU (slot M)  
 Site: Fitzgerald  
 Project: Marshall County, West Virginia  
 Design: rev9  
 Rig: Nabors B28

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	11556.00	29.88	278.550	10627.31	127.40	-3744.30	0.00	0.000	198.83	Survey @ 11556.00 MD 10627.31 TVD
2	11616.00	29.88	278.550	10679.33	131.84	-3773.86	0.00	0.000	196.97	
3	11716.00	29.88	278.550	10766.04	139.25	-3823.13	0.00	0.000	193.88	KOP Begin 8°/100' build/turn
4	12159.22	64.96	271.119	11061.47	160.26	-4143.34	8.00	-11.654	200.81	Begin 64.96° tangent
5	12807.97	64.96	271.119	11336.04	171.74	-4731.01	0.00	0.000	240.49	Begin 8°/100' build/turn
6	14278.98	89.00	149.723	11858.00	-830.04	-5206.86	8.00	-105.473	1279.87	Begin 89.00° lateral
7	23138.84	89.00	149.723	12012.63	-8480.24	-740.56	0.00	0.000	8512.51	PBHL/TD 23138.84 MD/12012.63 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Annotation
198.00	0.14	261.060	198.00	-0.04	-0.24	0.06	MWD surveys
23091.00	90.46	147.510	12015.03	-8416.64	-758.09	8450.68	Survey @ 23091.00 MD 12015.03 TVD
23150.00	90.46	147.510	12015.55	-8466.40	-726.40	8497.50	Survey projected to 23150.00 MD 12015.55 TVD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Fitzgerald-17HU BHL r9	12012.85	-8480.24	-740.5514446045.45	1740476.63		39.77786440	-80.64385977

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=1292.91+26 @ 1318.91ft (Nabors B28)

Northing	Easting	Latitude	Longitude
14454525.67	1741217.18	39.80114500	-80.64110300

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.935°



Azimuths to Grid North  
 True North: -0.23°  
 Magnetic North: -8.94°  
 Magnetic Field  
 Strength: 51822.2snT  
 Dip Angle: 66.61°  
 Date: 9/25/2020  
 Model: IGRF2020

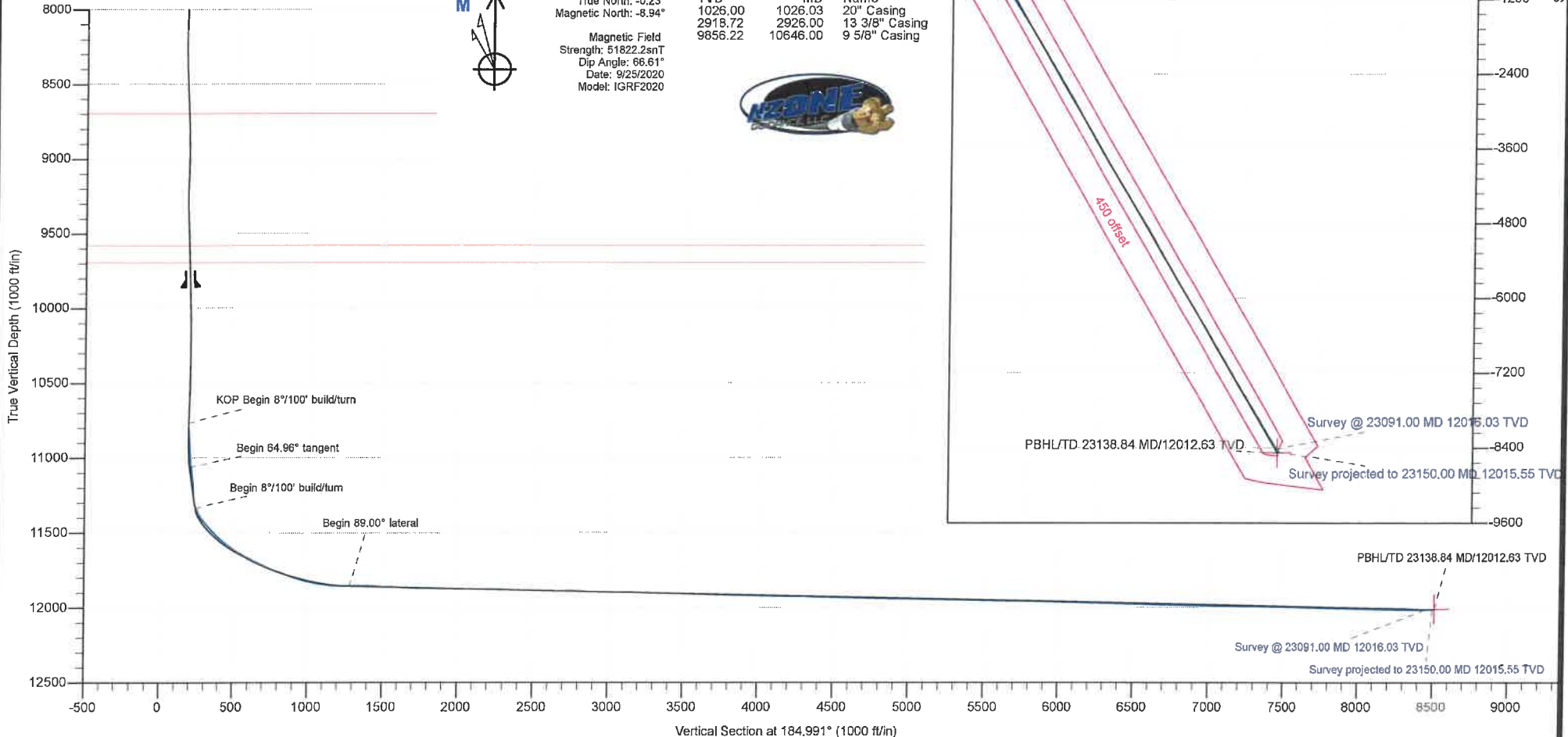
FORMATION TOP DETAILS

TVDPath	MDPath	Formation
6879.00	7267.58	Top Marcellus
6929.00	7319.26	Top Onondaga
7180.00	7578.02	Base Onondaga
7659.00	8086.35	Top Salina
8697.00	9291.52	Base Salina
9583.00	10327.09	Top Clinton
9696.00	10458.85	Base Clinton



CASING DETAILS

TVD	MD	Name
1026.00	1026.03	20" Casing
2918.72	2926.00	13 3/8" Casing
9656.22	10646.00	9 5/8" Casing



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Aug1919_v14

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

<b>Site</b>	Fitzgerald				
<b>Site Position:</b>		<b>Northing:</b>	14,454,567.73 usft	<b>Latitude:</b>	39.80126184
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,741,096.26 usft	<b>Longitude:</b>	-80.64153292
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.229 °

<b>Well</b>	Fitzgerald 17 HU (slot M)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	14,454,525.67 usft	<b>Latitude:</b>	39.80114500
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	1,741,217.18 usft	<b>Longitude:</b>	-80.64110300
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	1,292.91 ft

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	9/25/2020	-8.705	66.611	51,822.21235267

<b>Design</b>	Surveys Original Hole				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	184.991	

<b>Survey Program</b>	<b>Date</b>	12/10/2020			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
198.00	1,148.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,250.00	2,857.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,958.00	7,190.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
7,348.00	23,091.00	MWD lat (Original Hole)	MWD	MWD - Standard	
23,150.00	23,150.00	Projection (Original Hole)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198.00	0.14	261.060	198.00	-0.04	-0.24	0.06	0.07	0.07	0.00	0.00
<b>MWD surveys</b>										
238.00	0.13	289.100	238.00	-0.03	-0.33	0.06	0.17	-0.03	70.10	
285.00	0.22	276.790	285.00	0.00	-0.47	0.04	0.21	0.19	-26.19	
329.00	0.22	269.940	329.00	0.01	-0.64	0.05	0.06	0.00	-15.57	
374.00	0.26	277.670	374.00	0.02	-0.83	0.05	0.11	0.09	17.18	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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)	
420.00	0.22	261.060	420.00	0.02	-1.02	0.07	0.17	-0.09	-36.11	
465.00	0.40	283.210	465.00	0.04	-1.25	0.07	0.47	0.40	49.22	
510.00	0.35	281.270	510.00	0.11	-1.54	0.03	0.11	-0.11	-4.31	
555.00	0.40	284.260	555.00	0.17	-1.83	-0.01	0.12	0.11	6.64	
601.00	0.48	295.510	600.99	0.29	-2.16	-0.11	0.26	0.17	24.46	
646.00	0.53	299.380	645.99	0.48	-2.51	-0.26	0.13	0.11	8.60	
692.00	0.48	292.440	691.99	0.66	-2.87	-0.40	0.17	-0.11	-15.09	
737.00	0.44	298.940	736.99	0.81	-3.20	-0.53	0.15	-0.09	14.44	
783.00	0.57	300.520	782.99	1.01	-3.55	-0.70	0.28	0.28	3.43	
830.00	0.57	310.540	829.99	1.28	-3.93	-0.94	0.21	0.00	21.32	
877.00	0.70	314.410	876.98	1.64	-4.31	-1.26	0.29	0.28	8.23	
924.00	0.75	313.970	923.98	2.05	-4.74	-1.63	0.11	0.11	-0.94	
948.00	0.75	307.990	947.98	2.26	-4.98	-1.82	0.33	0.00	-24.92	
972.00	0.79	308.700	971.97	2.46	-5.23	-1.99	0.17	0.17	2.96	
1,019.00	0.92	307.120	1,018.97	2.89	-5.78	-2.37	0.28	0.28	-3.36	
1,066.00	0.97	315.900	1,065.96	3.40	-6.36	-2.83	0.33	0.11	18.68	
1,148.00	1.01	331.110	1,147.95	4.53	-7.19	-3.89	0.32	0.05	18.55	
1,250.00	0.40	343.060	1,249.94	5.66	-7.73	-4.97	0.61	-0.60	11.72	
1,345.00	0.70	225.640	1,344.94	5.57	-8.24	-4.83	1.00	0.32	-123.60	
1,440.00	2.33	218.350	1,439.90	3.65	-9.86	-2.78	1.72	1.72	-7.67	
1,534.00	4.26	219.220	1,533.74	-0.55	-13.25	1.70	2.05	2.05	0.93	
1,629.00	6.15	217.380	1,628.35	-7.33	-18.57	8.92	2.00	1.99	-1.94	
1,723.00	5.93	217.550	1,721.83	-15.18	-24.59	17.26	0.23	-0.23	0.18	
1,817.00	5.41	215.180	1,815.37	-22.65	-30.10	25.19	0.61	-0.55	-2.52	
1,912.00	6.02	214.650	1,909.89	-30.41	-35.51	33.39	0.64	0.64	-0.56	
2,006.00	5.58	213.510	2,003.41	-38.28	-40.84	41.68	0.48	-0.47	-1.21	
2,101.00	5.19	215.970	2,097.99	-45.61	-45.91	49.43	0.48	-0.41	2.59	
2,195.00	5.05	219.140	2,191.62	-52.26	-51.02	56.50	0.34	-0.15	3.37	
2,290.00	4.53	222.300	2,286.29	-58.27	-56.18	62.94	0.61	-0.55	3.33	
2,384.00	5.54	222.210	2,379.92	-64.38	-61.73	69.51	1.07	1.07	-0.10	
2,479.00	6.72	224.320	2,474.38	-71.75	-68.69	77.46	1.26	1.24	2.22	
2,573.00	6.28	225.380	2,567.77	-79.30	-76.20	85.63	0.49	-0.47	1.13	
2,668.00	6.77	214.830	2,662.16	-87.55	-83.09	94.44	1.36	0.52	-11.11	
2,763.00	6.37	213.690	2,756.54	-96.53	-89.22	103.92	0.44	-0.42	-1.20	
2,857.00	5.49	218.610	2,850.03	-104.38	-94.91	112.24	1.08	-0.94	5.23	
2,958.00	5.49	226.870	2,950.57	-111.46	-101.45	119.86	0.78	0.00	8.18	
3,052.00	5.80	227.570	3,044.12	-117.74	-108.24	126.71	0.34	0.33	0.74	
3,147.00	6.19	226.870	3,138.60	-124.48	-115.52	134.06	0.42	0.41	-0.74	
3,245.00	5.88	233.550	3,236.05	-131.07	-123.42	141.31	0.78	-0.32	6.82	
3,340.00	4.31	240.500	3,330.68	-135.72	-130.44	146.55	1.77	-1.65	7.32	
3,434.00	4.22	251.660	3,424.42	-138.55	-136.80	149.92	0.89	-0.10	11.87	
3,529.00	5.36	269.230	3,519.09	-139.71	-144.55	151.75	1.94	1.20	18.49	
3,623.00	7.47	276.620	3,612.50	-139.06	-155.01	152.02	2.41	2.24	7.86	
3,718.00	9.84	281.010	3,706.41	-136.80	-169.12	150.99	2.59	2.49	4.62	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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)
3,812.00	12.66	283.560	3,798.59	-132.85	-187.02	148.62	3.05	3.00	2.71
3,907.00	16.57	287.340	3,890.50	-126.37	-210.08	144.17	4.23	4.12	3.98
4,001.00	19.56	290.150	3,979.86	-116.95	-237.65	137.18	3.31	3.18	2.99
4,096.00	21.62	293.220	4,068.79	-104.57	-268.67	127.55	2.45	2.17	3.23
4,191.00	22.89	293.310	4,156.71	-90.36	-301.72	116.27	1.34	1.34	0.09
4,285.00	24.43	286.810	4,242.82	-77.50	-337.13	106.54	3.22	1.64	-6.91
4,379.00	27.42	279.520	4,327.38	-68.30	-377.10	100.84	4.64	3.18	-7.76
4,473.00	29.48	272.130	4,410.05	-63.85	-421.58	100.29	4.34	2.19	-7.86
4,568.00	27.68	267.560	4,493.48	-63.92	-466.99	104.31	2.98	-1.89	-4.81
4,663.00	26.93	268.090	4,577.89	-65.58	-510.54	109.75	0.83	-0.79	0.56
4,757.00	27.90	271.950	4,661.34	-65.54	-553.80	113.47	2.15	1.03	4.11
4,852.00	28.60	271.080	4,745.03	-64.36	-598.75	116.20	0.85	0.74	-0.92
4,946.00	30.54	269.140	4,826.78	-64.29	-645.13	120.17	2.30	2.06	-2.06
5,040.00	30.76	268.010	4,907.65	-65.49	-693.03	125.53	0.66	0.23	-1.20
5,135.00	32.17	267.740	4,988.68	-67.33	-742.58	131.67	1.49	1.48	-0.28
5,229.00	31.82	267.830	5,068.40	-69.25	-792.35	137.92	0.38	-0.37	0.10
5,324.00	32.52	267.830	5,148.81	-71.17	-842.90	144.23	0.74	0.74	0.00
5,419.00	30.89	267.920	5,229.63	-73.02	-892.79	150.41	1.72	-1.72	0.09
5,514.00	31.33	269.500	5,310.97	-74.12	-941.85	155.78	0.98	0.46	1.66
5,608.00	30.37	270.200	5,391.67	-74.25	-990.06	160.10	1.09	-1.02	0.74
5,703.00	29.48	270.370	5,474.00	-74.01	-1,037.45	163.99	0.94	-0.94	0.18
5,798.00	27.15	274.150	5,557.64	-72.29	-1,082.45	166.19	3.09	-2.45	3.98
5,892.00	27.20	275.560	5,641.26	-68.66	-1,125.22	166.29	0.69	0.05	1.50
5,986.00	27.64	274.330	5,724.70	-64.93	-1,168.35	166.33	0.76	0.47	-1.31
6,080.00	27.50	275.560	5,808.03	-61.18	-1,211.69	166.37	0.62	-0.15	1.31
6,175.00	26.89	274.410	5,892.53	-57.41	-1,254.94	166.37	0.85	-0.64	-1.21
6,270.00	26.76	274.160	5,977.31	-54.20	-1,297.69	166.90	0.18	-0.14	-0.26
6,365.00	27.38	274.600	6,061.90	-50.90	-1,340.80	167.36	0.69	0.65	0.46
6,459.00	28.48	275.390	6,144.95	-47.06	-1,384.66	167.35	1.23	1.17	0.84
6,554.00	28.26	271.700	6,228.54	-44.27	-1,429.69	168.48	1.86	-0.23	-3.88
6,649.00	28.96	272.400	6,311.94	-42.64	-1,475.15	170.81	0.82	0.74	0.74
6,735.00	28.34	272.490	6,387.42	-40.88	-1,516.35	172.64	0.72	-0.72	0.10
6,843.00	28.03	273.100	6,482.61	-38.39	-1,567.30	174.60	0.39	-0.29	0.56
6,938.00	24.74	274.600	6,567.70	-35.59	-1,609.41	175.47	3.53	-3.46	1.58
7,032.00	20.13	272.130	6,654.57	-33.41	-1,645.20	176.41	5.00	-4.90	-2.63
7,127.00	17.71	271.780	6,744.43	-32.35	-1,675.99	178.04	2.55	-2.55	-0.37
7,190.00	17.22	271.950	6,804.52	-31.74	-1,694.88	179.07	0.78	-0.78	0.27
7,348.00	13.27	271.340	6,956.93	-30.52	-1,736.40	181.47	2.50	-2.50	-0.39
7,442.00	13.71	269.930	7,048.34	-30.28	-1,758.33	183.14	0.58	0.47	-1.50
7,537.00	14.85	274.500	7,140.41	-29.34	-1,781.72	184.23	1.69	1.20	4.81
7,630.00	16.30	277.060	7,229.99	-26.80	-1,806.56	183.87	1.73	1.56	2.75
7,724.00	17.45	275.470	7,319.94	-23.83	-1,833.68	183.27	1.32	1.22	-1.69
7,789.00	18.46	276.090	7,381.77	-21.81	-1,853.61	182.99	1.58	1.55	0.95

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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)
7,882.00	20.21	277.400	7,469.53	-18.18	-1,884.19	182.04	1.94	1.88	1.41
7,976.00	22.06	277.670	7,557.20	-13.73	-1,917.79	180.53	1.97	1.97	0.29
8,071.00	23.16	276.790	7,644.90	-9.14	-1,954.02	179.11	1.21	1.16	-0.93
8,166.00	23.73	277.140	7,732.05	-4.56	-1,991.54	177.80	0.62	0.60	0.37
8,261.00	24.26	276.710	7,818.84	0.10	-2,029.89	176.50	0.59	0.56	-0.45
8,355.00	27.33	279.070	7,903.47	5.76	-2,070.39	174.39	3.44	3.27	2.51
8,544.00	32.78	278.550	8,067.00	20.21	-2,163.89	168.12	2.89	2.88	-0.28
8,639.00	32.87	276.880	8,146.83	27.13	-2,214.92	165.67	0.96	0.09	-1.76
8,733.00	33.00	274.860	8,225.72	32.35	-2,265.75	164.89	1.18	0.14	-2.15
8,828.00	33.31	273.980	8,305.26	36.35	-2,317.55	165.41	0.60	0.33	-0.93
8,923.00	33.09	271.600	8,384.75	38.89	-2,369.50	167.40	1.39	-0.23	-2.51
9,017.00	32.51	271.080	8,463.77	40.08	-2,420.41	170.65	0.69	-0.62	-0.55
9,110.00	32.25	270.720	8,542.31	40.86	-2,470.21	174.20	0.35	-0.28	-0.39
9,204.00	31.77	269.670	8,622.01	41.04	-2,520.03	178.36	0.78	-0.51	-1.12
9,299.00	30.19	272.050	8,703.46	41.75	-2,568.92	181.91	2.10	-1.66	2.51
9,394.00	29.22	272.570	8,785.98	43.64	-2,615.95	184.11	1.06	-1.02	0.55
9,488.00	28.56	271.600	8,868.28	45.30	-2,661.33	186.41	0.86	-0.70	-1.03
9,582.00	30.54	276.180	8,950.06	48.50	-2,707.55	187.24	3.19	2.11	4.87
9,677.00	32.08	277.580	9,031.22	54.42	-2,756.56	185.60	1.79	1.62	1.47
9,771.00	32.56	277.580	9,110.66	61.05	-2,806.37	183.33	0.51	0.51	0.00
9,862.00	32.83	278.110	9,187.24	67.76	-2,855.07	180.88	0.43	0.30	0.58
9,956.00	32.17	274.510	9,266.53	73.32	-2,905.25	179.71	2.17	-0.70	-3.83
10,049.00	31.72	271.250	9,345.45	75.81	-2,954.37	181.51	1.92	-0.48	-3.51
10,144.00	31.81	271.950	9,426.22	77.20	-3,004.37	184.47	0.40	0.09	0.74
10,239.00	30.94	271.960	9,507.33	78.89	-3,053.80	187.09	0.92	-0.92	0.01
10,333.00	30.62	273.450	9,588.09	81.16	-3,101.84	189.01	0.88	-0.34	1.59
10,427.00	31.20	271.430	9,668.74	83.20	-3,150.08	191.17	1.26	0.62	-2.15
10,521.00	30.81	270.820	9,749.31	84.16	-3,198.49	194.43	0.53	-0.41	-0.65
10,616.00	31.46	271.520	9,830.62	85.16	-3,247.60	197.70	0.78	0.68	0.74
10,710.00	31.29	271.430	9,910.88	86.42	-3,296.52	200.70	0.19	-0.18	-0.10
10,805.00	32.21	273.270	9,991.66	88.48	-3,346.47	202.99	1.41	0.97	1.94
10,899.00	31.95	273.800	10,071.31	91.56	-3,396.29	204.26	0.41	-0.28	0.56
10,994.00	32.61	274.680	10,151.63	95.31	-3,446.89	204.92	0.85	0.69	0.93
11,086.00	33.26	275.650	10,228.84	99.82	-3,496.70	204.77	0.91	0.71	1.05
11,181.00	32.43	276.000	10,308.66	105.05	-3,547.96	204.02	0.90	-0.87	0.37
11,274.00	32.12	275.560	10,387.29	110.05	-3,597.37	203.34	0.42	-0.33	-0.47
11,369.00	32.78	276.350	10,467.45	115.34	-3,648.07	202.47	0.83	0.69	0.83
11,463.00	31.16	276.880	10,547.19	121.07	-3,697.50	201.07	1.75	-1.72	0.56
11,556.00	29.88	278.550	10,627.31	127.40	-3,744.30	198.84	1.65	-1.38	1.80
11,635.00	29.10	279.870	10,696.07	133.61	-3,782.69	195.98	1.29	-0.99	1.67
11,682.00	28.70	278.290	10,737.22	137.20	-3,805.12	194.36	1.83	-0.85	-3.36
11,730.00	32.39	274.330	10,778.56	139.83	-3,829.35	193.85	8.75	7.69	-8.25
11,777.00	35.99	271.430	10,817.43	141.13	-3,855.72	194.85	8.41	7.66	-6.17

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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)	
11,824.00	38.50	269.670	10,854.84	141.39	-3,884.16	197.06	5.80	5.34	-3.74	
11,871.00	42.67	271.080	10,890.53	141.61	-3,914.73	199.51	9.08	8.87	3.00	
11,919.00	46.98	273.190	10,924.57	142.89	-3,948.53	201.17	9.50	8.98	4.40	
11,966.00	50.89	273.720	10,955.44	145.03	-3,983.89	202.12	8.36	8.32	1.13	
12,013.00	54.18	273.540	10,984.02	147.39	-4,021.12	203.00	7.01	7.00	-0.38	
12,060.00	57.17	271.870	11,010.52	149.21	-4,059.88	204.56	7.01	6.36	-3.55	
12,108.00	60.69	270.730	11,035.29	150.14	-4,100.98	207.21	7.61	7.33	-2.38	
12,155.00	63.90	269.760	11,057.14	150.31	-4,142.59	210.66	7.07	6.83	-2.06	
12,202.00	65.39	271.520	11,077.27	150.79	-4,185.05	213.88	4.64	3.17	3.74	
12,249.00	67.20	273.190	11,096.16	152.56	-4,228.05	215.85	5.04	3.85	3.55	
12,297.00	67.76	272.930	11,114.55	154.93	-4,272.32	217.35	1.27	1.17	-0.54	
12,344.00	67.89	271.430	11,132.29	156.58	-4,315.81	219.48	2.97	0.28	-3.19	
12,391.00	66.18	271.080	11,150.63	157.53	-4,359.08	222.30	3.70	-3.64	-0.74	
12,438.00	66.88	272.830	11,169.35	159.00	-4,402.16	224.58	3.73	1.49	3.72	
12,486.00	65.70	272.930	11,188.65	161.21	-4,446.05	226.20	2.47	-2.46	0.21	
12,533.00	65.57	273.630	11,208.04	163.66	-4,488.80	227.48	1.38	-0.28	1.49	
12,581.00	63.76	274.680	11,228.58	166.80	-4,532.06	228.12	4.26	-3.77	2.19	
12,628.00	64.07	273.190	11,249.24	169.70	-4,574.17	228.90	2.92	0.66	-3.17	
12,676.00	64.20	271.780	11,270.18	171.57	-4,617.32	230.78	2.66	0.27	-2.94	
12,723.00	64.38	271.260	11,290.57	172.69	-4,659.66	233.35	1.07	0.38	-1.11	
12,770.00	64.20	269.150	11,310.96	172.84	-4,702.00	236.88	4.06	-0.38	-4.49	
12,817.00	64.78	267.120	11,331.21	171.46	-4,744.39	241.95	4.09	1.23	-4.32	
12,865.00	64.07	263.080	11,351.94	167.77	-4,787.52	249.38	7.73	-1.48	-8.42	
12,912.00	61.39	256.670	11,373.49	160.46	-4,828.61	260.23	13.39	-5.70	-13.64	
12,957.00	60.29	252.360	11,395.42	149.98	-4,866.47	273.97	8.71	-2.44	-9.58	
13,006.00	59.68	247.880	11,419.94	135.56	-4,906.36	291.80	8.01	-1.24	-9.14	
13,054.00	60.07	245.150	11,444.03	119.02	-4,944.43	311.60	4.99	0.81	-5.69	
13,101.00	59.90	243.220	11,467.55	101.30	-4,981.06	332.44	3.57	-0.36	-4.11	
13,149.00	60.07	240.750	11,491.56	81.78	-5,017.75	355.07	4.47	0.35	-5.15	
13,196.00	60.29	236.980	11,514.94	60.70	-5,052.65	379.11	6.97	0.47	-8.02	
13,243.00	60.47	233.730	11,538.17	37.47	-5,086.25	405.17	6.02	0.38	-6.91	
13,290.00	60.07	229.770	11,561.49	12.22	-5,118.30	433.12	7.37	-0.85	-8.43	
13,338.00	59.99	225.550	11,585.47	-15.78	-5,149.02	463.68	7.62	-0.17	-8.79	
13,385.00	61.00	221.250	11,608.63	-45.50	-5,177.11	495.73	8.25	2.15	-9.15	
13,433.00	62.01	215.270	11,631.55	-78.60	-5,203.21	530.98	11.15	2.10	-12.46	
13,480.00	63.90	210.520	11,652.92	-113.74	-5,225.92	567.96	9.86	4.02	-10.11	
13,527.00	65.08	209.120	11,673.17	-150.55	-5,247.01	606.46	3.68	2.51	-2.98	
13,584.00	65.86	207.270	11,696.83	-196.25	-5,271.51	654.12	3.25	1.37	-3.25	
13,638.00	65.60	202.880	11,719.04	-240.82	-5,292.36	700.34	7.43	-0.48	-8.13	
13,685.00	66.57	198.310	11,738.10	-281.03	-5,307.46	741.71	9.12	2.06	-9.72	
13,732.00	68.24	193.030	11,756.17	-322.79	-5,319.17	784.33	10.96	3.55	-11.23	
13,783.00	69.80	188.900	11,774.43	-369.53	-5,328.21	831.67	8.16	3.06	-8.10	
13,830.00	70.95	185.650	11,790.22	-413.43	-5,333.81	875.90	6.96	2.45	-6.91	
13,878.00	72.00	182.490	11,805.48	-458.82	-5,337.04	921.40	6.61	2.19	-6.58	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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)	
13,909.00	72.97	180.290	11,814.81	-488.37	-5,337.76	950.90	7.46	3.13	-7.10	
13,941.00	74.46	178.970	11,823.78	-519.09	-5,337.56	981.48	6.11	4.66	-4.13	
13,966.00	76.26	178.880	11,830.10	-543.27	-5,337.10	1,005.53	7.21	7.20	-0.36	
14,013.00	79.38	175.100	11,840.02	-589.13	-5,334.68	1,051.01	10.29	6.64	-8.04	
14,043.00	81.32	170.180	11,845.05	-618.45	-5,330.89	1,079.89	17.41	6.47	-16.40	
14,061.00	82.99	167.540	11,847.51	-635.95	-5,327.44	1,097.02	17.24	9.28	-14.67	
14,108.00	84.40	163.330	11,852.67	-681.15	-5,315.70	1,141.03	9.39	3.00	-8.96	
14,156.00	87.82	159.630	11,855.93	-726.54	-5,300.49	1,184.93	10.48	7.13	-7.71	
14,203.00	90.77	154.890	11,856.51	-769.87	-5,282.33	1,226.51	11.88	6.28	-10.09	
14,250.00	91.56	150.760	11,855.55	-811.66	-5,260.87	1,266.28	8.94	1.68	-8.79	
14,297.00	90.37	148.030	11,854.76	-852.11	-5,236.95	1,304.49	6.34	-2.53	-5.81	
14,345.00	88.79	148.030	11,855.11	-892.82	-5,211.54	1,342.84	3.29	-3.29	0.00	
14,440.00	88.62	148.650	11,857.26	-973.66	-5,161.69	1,419.03	0.68	-0.18	0.65	
14,534.00	87.60	147.150	11,860.36	-1,053.25	-5,111.76	1,493.97	1.93	-1.09	-1.60	
14,628.00	87.96	147.070	11,864.00	-1,132.12	-5,060.76	1,568.11	0.39	0.38	-0.09	
14,723.00	88.13	147.070	11,867.24	-1,211.81	-5,009.14	1,643.01	0.18	0.18	0.00	
14,818.00	88.18	147.150	11,870.30	-1,291.54	-4,957.58	1,717.95	0.10	0.05	0.08	
14,912.00	89.05	147.940	11,872.57	-1,370.84	-4,907.16	1,792.56	1.25	0.93	0.84	
15,007.00	89.27	147.420	11,873.96	-1,451.11	-4,856.37	1,868.11	0.59	0.23	-0.55	
15,102.00	89.58	146.980	11,874.92	-1,530.96	-4,804.91	1,943.18	0.57	0.33	-0.46	
15,196.00	89.67	147.860	11,875.53	-1,610.16	-4,754.30	2,017.68	0.94	0.10	0.94	
15,291.00	89.41	148.650	11,876.29	-1,690.95	-4,704.31	2,093.81	0.88	-0.27	0.83	
15,385.00	89.93	149.440	11,876.84	-1,771.56	-4,655.96	2,169.91	1.01	0.55	0.84	
15,480.00	88.04	150.050	11,878.52	-1,853.60	-4,608.11	2,247.48	2.09	-1.99	0.64	
15,574.00	88.48	149.440	11,881.37	-1,934.76	-4,560.77	2,324.21	0.80	0.47	-0.65	
15,669.00	89.19	149.350	11,883.30	-2,016.51	-4,512.41	2,401.44	0.75	0.75	-0.09	
15,763.00	89.05	149.440	11,884.75	-2,097.41	-4,464.56	2,477.87	0.18	-0.15	0.10	
15,857.00	89.10	149.090	11,886.26	-2,178.19	-4,416.53	2,554.17	0.38	0.05	-0.37	
15,952.00	89.32	148.740	11,887.57	-2,259.54	-4,367.48	2,630.94	0.44	0.23	-0.37	
16,046.00	89.01	150.230	11,888.94	-2,340.51	-4,319.76	2,707.45	1.62	-0.33	1.59	
16,139.00	88.97	149.700	11,890.58	-2,421.01	-4,273.22	2,783.60	0.57	-0.04	-0.57	
16,234.00	88.92	148.650	11,892.33	-2,502.58	-4,224.55	2,860.62	1.11	-0.05	-1.11	
16,329.00	88.79	149.260	11,894.23	-2,583.95	-4,175.57	2,937.43	0.66	-0.14	0.64	
16,423.00	89.05	149.260	11,896.00	-2,664.73	-4,127.53	3,013.72	0.28	0.28	0.00	
16,517.00	89.54	149.970	11,897.16	-2,745.81	-4,079.98	3,090.36	0.92	0.52	0.76	
16,611.00	89.45	149.970	11,897.99	-2,827.19	-4,032.94	3,167.33	0.10	-0.10	0.00	
16,706.00	89.36	151.810	11,898.97	-2,910.18	-3,986.73	3,245.99	1.94	-0.09	1.94	
16,801.00	88.04	150.930	11,901.13	-2,993.54	-3,941.23	3,325.08	1.67	-1.39	-0.93	
16,896.00	87.74	151.280	11,904.63	-3,076.66	-3,895.35	3,403.89	0.49	-0.32	0.37	
16,990.00	88.22	151.110	11,907.94	-3,158.98	-3,850.09	3,481.95	0.54	0.51	-0.18	
17,085.00	88.18	150.670	11,910.93	-3,241.94	-3,803.90	3,560.58	0.46	-0.04	-0.46	
17,177.00	88.62	150.490	11,913.49	-3,322.04	-3,758.72	3,636.45	0.52	0.48	-0.20	
17,271.00	89.01	150.230	11,915.44	-3,403.72	-3,712.24	3,713.78	0.50	0.41	-0.28	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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)	
17,365.00	88.57	149.880	11,917.42	-3,485.16	-3,665.33	3,790.82	0.60	-0.47	-0.37	
17,459.00	88.84	149.180	11,919.55	-3,566.15	-3,617.68	3,867.37	0.80	0.29	-0.74	
17,554.00	89.10	149.090	11,921.26	-3,647.69	-3,568.95	3,944.35	0.29	0.27	-0.09	
17,649.00	89.23	149.000	11,922.64	-3,729.15	-3,520.09	4,021.25	0.17	0.14	-0.09	
17,744.00	89.19	148.910	11,923.95	-3,810.53	-3,471.10	4,098.07	0.10	-0.04	-0.09	
17,839.00	89.36	148.380	11,925.15	-3,891.65	-3,421.68	4,174.58	0.59	0.18	-0.56	
17,932.00	88.70	149.090	11,926.73	-3,971.13	-3,373.42	4,249.56	1.04	-0.71	0.76	
18,027.00	89.01	148.650	11,928.62	-4,052.43	-3,324.31	4,326.28	0.57	0.33	-0.46	
18,122.00	88.62	149.180	11,930.59	-4,133.78	-3,275.27	4,403.05	0.69	-0.41	0.56	
18,216.00	88.66	148.820	11,932.82	-4,214.33	-3,226.87	4,479.08	0.39	0.04	-0.38	
18,311.00	88.35	149.350	11,935.30	-4,295.80	-3,178.08	4,556.00	0.65	-0.33	0.56	
18,405.00	88.97	149.880	11,937.50	-4,376.87	-3,130.55	4,632.63	0.87	0.66	0.56	
18,499.00	89.45	149.880	11,938.79	-4,458.17	-3,083.38	4,709.52	0.51	0.51	0.00	
18,593.00	89.67	149.440	11,939.51	-4,539.29	-3,035.90	4,786.20	0.52	0.23	-0.47	
18,688.00	89.63	148.820	11,940.10	-4,620.83	-2,987.16	4,863.19	0.65	-0.04	-0.65	
18,783.00	89.27	149.000	11,941.01	-4,702.18	-2,938.11	4,939.96	0.42	-0.38	0.19	
18,877.00	88.70	149.530	11,942.67	-4,782.96	-2,890.07	5,016.26	0.83	-0.61	0.56	
18,972.00	88.40	150.410	11,945.08	-4,865.18	-2,842.55	5,094.04	0.98	-0.32	0.93	
19,067.00	88.70	150.490	11,947.48	-4,947.80	-2,795.71	5,172.26	0.33	0.32	0.08	
19,161.00	88.66	149.880	11,949.65	-5,029.34	-2,748.99	5,249.43	0.65	-0.04	-0.65	
19,256.00	89.23	150.930	11,951.39	-5,111.93	-2,702.08	5,327.62	1.26	0.60	1.11	
19,350.00	89.32	150.490	11,952.58	-5,193.90	-2,656.09	5,405.29	0.48	0.10	-0.47	
19,445.00	89.19	150.230	11,953.82	-5,276.46	-2,609.12	5,483.45	0.31	-0.14	-0.27	
19,538.00	89.23	149.700	11,955.10	-5,356.97	-2,562.57	5,559.60	0.57	0.04	-0.57	
19,633.00	89.05	150.320	11,956.53	-5,439.24	-2,515.09	5,637.43	0.68	-0.19	0.65	
19,727.00	89.49	149.880	11,957.73	-5,520.72	-2,468.24	5,714.52	0.66	0.47	-0.47	
19,821.00	89.23	150.140	11,958.78	-5,602.13	-2,421.25	5,791.54	0.39	-0.28	0.28	
19,916.00	88.35	150.490	11,960.78	-5,684.64	-2,374.22	5,869.64	1.00	-0.93	0.37	
20,010.00	88.70	149.970	11,963.20	-5,766.21	-2,327.56	5,946.84	0.67	0.37	-0.55	
20,104.00	88.66	149.350	11,965.37	-5,847.31	-2,280.09	6,023.51	0.66	-0.04	-0.66	
20,199.00	88.92	148.910	11,967.37	-5,928.84	-2,231.36	6,100.48	0.54	0.27	-0.46	
20,293.00	88.70	149.610	11,969.32	-6,009.61	-2,183.32	6,176.77	0.78	-0.23	0.74	
20,388.00	88.75	149.350	11,971.44	-6,091.43	-2,135.09	6,254.08	0.28	0.05	-0.27	
20,483.00	88.88	149.180	11,973.40	-6,173.07	-2,086.55	6,331.19	0.23	0.14	-0.18	
20,577.00	89.01	149.000	11,975.13	-6,253.70	-2,038.27	6,407.32	0.24	0.14	-0.19	
20,672.00	88.13	149.530	11,977.50	-6,335.33	-1,989.73	6,484.42	1.08	-0.93	0.56	
20,766.00	88.09	149.000	11,980.60	-6,416.09	-1,941.72	6,560.69	0.57	-0.04	-0.56	
20,861.00	88.31	149.610	11,983.59	-6,497.74	-1,893.25	6,637.81	0.68	0.23	0.64	
20,956.00	88.84	150.140	11,985.95	-6,579.88	-1,845.59	6,715.49	0.79	0.56	0.56	
21,050.00	89.32	150.230	11,987.46	-6,661.43	-1,798.85	6,792.67	0.52	0.51	0.10	
21,145.00	89.45	150.050	11,988.48	-6,743.81	-1,751.56	6,870.62	0.23	0.14	-0.19	
21,240.00	89.71	149.610	11,989.18	-6,825.94	-1,703.82	6,948.29	0.54	0.27	-0.46	
21,334.00	89.14	150.140	11,990.12	-6,907.24	-1,656.64	7,025.17	0.83	-0.61	0.56	



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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)	
21,428.00	89.54	149.530	11,991.20	-6,988.50	-1,609.41	7,102.02	0.78	0.43	-0.65	
21,523.00	89.27	150.140	11,992.19	-7,070.63	-1,561.68	7,179.69	0.70	-0.28	0.64	
21,616.00	89.76	149.530	11,992.98	-7,151.03	-1,514.95	7,255.72	0.84	0.53	-0.66	
21,710.00	89.41	149.350	11,993.66	-7,231.98	-1,467.15	7,332.20	0.42	-0.37	-0.19	
21,803.00	88.53	148.820	11,995.33	-7,311.75	-1,419.38	7,407.51	1.10	-0.95	-0.57	
21,898.00	88.62	149.880	11,997.69	-7,393.45	-1,370.97	7,484.69	1.12	0.09	1.12	
21,990.00	89.23	149.180	11,999.42	-7,472.73	-1,324.33	7,559.61	1.01	0.66	-0.76	
22,085.00	88.84	149.610	12,001.02	-7,554.48	-1,275.97	7,636.85	0.61	-0.41	0.45	
22,179.00	88.53	149.790	12,003.17	-7,635.62	-1,228.55	7,713.55	0.38	-0.33	0.19	
22,274.00	89.49	149.790	12,004.82	-7,717.71	-1,180.76	7,791.17	1.01	1.01	0.00	
22,368.00	89.14	150.320	12,005.94	-7,799.15	-1,133.84	7,868.22	0.68	-0.37	0.56	
22,462.00	88.62	149.000	12,007.78	-7,880.26	-1,086.37	7,944.89	1.51	-0.55	-1.40	
22,557.00	88.48	149.180	12,010.18	-7,961.74	-1,037.58	8,021.82	0.24	-0.15	0.19	
22,651.00	88.40	149.000	12,012.74	-8,042.36	-989.32	8,097.94	0.21	-0.09	-0.19	
22,746.00	88.92	148.820	12,014.96	-8,123.69	-940.27	8,174.69	0.58	0.55	-0.19	
22,841.00	89.58	148.740	12,016.21	-8,204.93	-891.04	8,251.34	0.70	0.69	-0.08	
22,935.00	89.93	147.860	12,016.61	-8,284.90	-841.64	8,326.71	1.01	0.37	-0.94	
23,030.00	90.29	147.510	12,016.43	-8,365.19	-790.86	8,402.28	0.53	0.38	-0.37	
23,091.00	90.46	147.510	12,016.03	-8,416.64	-758.09	8,450.68	0.28	0.28	0.00	
<b>Survey @ 23091.00 MD 12016.03 TVD</b>										
23,150.00	90.46	147.510	12,015.55	-8,466.40	-726.40	8,497.50	0.00	0.00	0.00	
<b>Survey projected to 23150.00 MD 12015.55 TVD</b>										

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
198.00	198.00	-0.04	-0.24	MWD surveys
23,091.00	12,016.03	-8,416.64	-758.09	Survey @ 23091.00 MD 12016.03 TVD



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Aug1919_v14

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

<b>Site</b>	Fitzgerald				
<b>Site Position:</b>		<b>Northing:</b>	14,454,567.73 usft	<b>Latitude:</b>	39.80126184
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,741,096.26 usft	<b>Longitude:</b>	-80.64153292
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.229 °

<b>Well</b>	Fitzgerald 17 HU (slot M)					
<b>Well Position</b>	<b>+N-S</b>	0.00 ft	<b>Northing:</b>	14,454,525.67 usft	<b>Latitude:</b>	39.80114500
	<b>+E-W</b>	0.00 ft	<b>Easting:</b>	1,741,217.18 usft	<b>Longitude:</b>	-80.64110300
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	1,292.91 ft

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	IGRF2020	9/25/2020	(°)	(°)	(nT)
			-8.705	66.611	51,822.21235267

<b>Design</b>	Surveys Original Hole				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N-S</b>	<b>+E-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.00	0.00	0.00	184.991	

<b>Survey Program</b>	<b>Date</b>	12/10/2020			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
198.00	1,148.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,250.00	2,857.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,958.00	7,190.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
7,348.00	23,091.00	MWD lat (Original Hole)	MWD	MWD - Standard	
23,150.00	23,150.00	Projection (Original Hole)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N-S (ft)</b>	<b>+E-W (ft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>	
0.00	0.00	0.000	0.00	0.00	0.00	14,454,525.67	1,741,217.18	39.80114500	-80.64110300	
198.00	0.14	261.060	198.00	-0.04	-0.24	14,454,525.64	1,741,216.94	39.80114490	-80.64110385	
<b>MWD surveys</b>										
238.00	0.13	289.100	238.00	-0.03	-0.33	14,454,525.64	1,741,216.85	39.80114492	-80.64110418	
285.00	0.22	276.790	285.00	0.00	-0.47	14,454,525.67	1,741,216.71	39.80114500	-80.64110467	
329.00	0.22	269.940	329.00	0.01	-0.64	14,454,525.68	1,741,216.54	39.80114503	-80.64110527	
374.00	0.26	277.670	374.00	0.02	-0.83	14,454,525.69	1,741,216.35	39.80114507	-80.64110594	
420.00	0.22	261.060	420.00	0.02	-1.02	14,454,525.70	1,741,216.16	39.80114507	-80.64110662	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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	
465.00	0.40	283.210	465.00	0.04	-1.25	14,454,525.72	1,741,215.92	39.80114514	-80.64110747	
510.00	0.35	281.270	510.00	0.11	-1.54	14,454,525.78	1,741,215.63	39.80114531	-80.64110849	
555.00	0.40	284.260	555.00	0.17	-1.83	14,454,525.85	1,741,215.35	39.80114549	-80.64110951	
601.00	0.48	295.510	600.99	0.29	-2.16	14,454,525.97	1,741,215.02	39.80114584	-80.64111068	
646.00	0.53	299.380	645.99	0.48	-2.51	14,454,526.15	1,741,214.67	39.80114634	-80.64111193	
692.00	0.48	292.440	691.99	0.66	-2.87	14,454,526.33	1,741,214.30	39.80114683	-80.64111322	
737.00	0.44	298.940	736.99	0.81	-3.20	14,454,526.49	1,741,213.98	39.80114727	-80.64111438	
783.00	0.57	300.520	782.99	1.01	-3.55	14,454,526.69	1,741,213.63	39.80114782	-80.64111563	
830.00	0.57	310.540	829.99	1.28	-3.93	14,454,526.96	1,741,213.25	39.80114857	-80.64111698	
877.00	0.70	314.410	876.98	1.64	-4.31	14,454,527.31	1,741,212.86	39.80114954	-80.64111833	
924.00	0.75	313.970	923.98	2.05	-4.74	14,454,527.72	1,741,212.44	39.80115069	-80.64111985	
948.00	0.75	307.990	947.98	2.26	-4.98	14,454,527.93	1,741,212.20	39.80115125	-80.64112069	
972.00	0.79	308.700	971.97	2.46	-5.23	14,454,528.13	1,741,211.95	39.80115181	-80.64112158	
1,019.00	0.92	307.120	1,018.97	2.89	-5.78	14,454,528.56	1,741,211.39	39.80115299	-80.64112355	
1,066.00	0.97	315.900	1,065.96	3.40	-6.36	14,454,529.07	1,741,210.82	39.80115441	-80.64112560	
1,148.00	1.01	331.110	1,147.95	4.53	-7.19	14,454,530.21	1,741,209.98	39.80115753	-80.64112855	
1,250.00	0.40	343.060	1,249.94	5.66	-7.73	14,454,531.33	1,741,209.45	39.80116063	-80.64113044	
1,345.00	0.70	225.640	1,344.94	5.57	-8.24	14,454,531.24	1,741,208.93	39.80116039	-80.64113227	
1,440.00	2.33	218.350	1,439.90	3.65	-9.86	14,454,529.32	1,741,207.32	39.80115514	-80.64113804	
1,534.00	4.26	219.220	1,533.74	-0.55	-13.25	14,454,525.12	1,741,203.93	39.80114363	-80.64115018	
1,629.00	6.15	217.380	1,628.35	-7.33	-18.57	14,454,518.34	1,741,198.61	39.80112507	-80.64116922	
1,723.00	5.93	217.550	1,721.83	-15.18	-24.59	14,454,510.49	1,741,192.59	39.80110358	-80.64119075	
1,817.00	5.41	215.180	1,815.37	-22.65	-30.10	14,454,503.02	1,741,187.08	39.80108312	-80.64121049	
1,912.00	6.02	214.650	1,909.89	-30.41	-35.51	14,454,495.26	1,741,181.67	39.80106188	-80.64122987	
2,006.00	5.58	213.510	2,003.41	-38.28	-40.84	14,454,487.40	1,741,176.34	39.80104033	-80.64124894	
2,101.00	5.19	215.970	2,097.99	-45.61	-45.91	14,454,480.07	1,741,171.27	39.80102026	-80.64126711	
2,195.00	5.05	219.140	2,191.62	-52.26	-51.02	14,454,473.42	1,741,166.16	39.80100206	-80.64128539	
2,290.00	4.53	222.300	2,286.29	-58.27	-56.18	14,454,467.40	1,741,160.99	39.80098559	-80.64130387	
2,384.00	5.54	222.210	2,379.92	-64.38	-61.73	14,454,461.29	1,741,155.45	39.80096888	-80.64132370	
2,479.00	6.72	224.320	2,474.38	-71.75	-68.69	14,454,453.92	1,741,148.48	39.80094871	-80.64134860	
2,573.00	6.28	225.380	2,567.77	-79.30	-76.20	14,454,446.37	1,741,140.98	39.80092807	-80.64137542	
2,668.00	6.77	214.830	2,662.16	-87.55	-83.09	14,454,438.13	1,741,134.08	39.80090550	-80.64140010	
2,763.00	6.37	213.690	2,756.54	-96.53	-89.22	14,454,429.15	1,741,127.96	39.80088090	-80.64142202	
2,857.00	5.49	218.610	2,850.03	-104.38	-94.91	14,454,421.29	1,741,122.26	39.80085940	-80.64144242	
2,958.00	5.49	226.870	2,950.57	-111.46	-101.45	14,454,414.22	1,741,115.72	39.80084003	-80.64146581	
3,052.00	5.80	227.570	3,044.12	-117.74	-108.24	14,454,407.94	1,741,108.94	39.80082286	-80.64149006	
3,147.00	6.19	226.870	3,138.60	-124.48	-115.52	14,454,401.20	1,741,101.65	39.80080443	-80.64151608	
3,245.00	5.88	233.550	3,236.05	-131.07	-123.42	14,454,394.60	1,741,093.76	39.80078641	-80.64154428	
3,340.00	4.31	240.500	3,330.68	-135.72	-130.44	14,454,389.95	1,741,086.74	39.80077372	-80.64156935	
3,434.00	4.22	251.660	3,424.42	-138.55	-136.80	14,454,387.13	1,741,080.38	39.80076602	-80.64159202	
3,529.00	5.36	269.230	3,519.09	-139.71	-144.55	14,454,385.97	1,741,072.63	39.80076292	-80.64161965	
3,623.00	7.47	276.620	3,612.50	-139.06	-155.01	14,454,386.61	1,741,062.17	39.80076481	-80.64165689	
3,718.00	9.84	281.010	3,706.41	-136.80	-169.12	14,454,388.87	1,741,048.06	39.80077118	-80.64170707	
3,812.00	12.66	283.560	3,798.59	-132.85	-187.02	14,454,392.82	1,741,030.16	39.80078222	-80.64177075	
3,907.00	16.57	287.340	3,890.50	-126.37	-210.08	14,454,399.30	1,741,007.10	39.80080027	-80.64185276	
4,001.00	19.56	290.150	3,979.86	-116.95	-237.65	14,454,408.72	1,740,979.53	39.80082644	-80.64195080	
4,096.00	21.62	293.220	4,068.79	-104.57	-268.67	14,454,421.10	1,740,948.51	39.80086078	-80.64206106	
4,191.00	22.89	293.310	4,156.71	-90.36	-301.72	14,454,435.31	1,740,915.46	39.80090017	-80.64217854	
4,285.00	24.43	286.810	4,242.82	-77.50	-337.13	14,454,448.17	1,740,880.05	39.80093587	-80.64230441	
4,379.00	27.42	279.520	4,327.38	-68.30	-377.10	14,454,457.38	1,740,840.08	39.80096159	-80.64244660	
4,473.00	29.48	272.130	4,410.05	-63.85	-421.58	14,454,461.82	1,740,795.60	39.80097428	-80.64260489	
4,568.00	27.68	267.560	4,493.48	-63.92	-466.99	14,454,461.75	1,740,750.19	39.80097458	-80.64276659	
4,663.00	26.93	268.090	4,577.89	-65.58	-510.54	14,454,460.09	1,740,706.64	39.80097051	-80.64292165	
4,757.00	27.90	271.950	4,661.34	-65.54	-553.80	14,454,460.13	1,740,663.38	39.80097109	-80.64307567	
4,852.00	28.60	271.080	4,745.03	-64.36	-598.75	14,454,461.32	1,740,618.43	39.80097484	-80.64323569	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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	
4,946.00	30.54	269.140	4,826.78	-64.29	-645.13	14,454,461.38	1,740,572.05	39.80097552	-80.64340082	
5,040.00	30.76	268.010	4,907.65	-65.49	-693.03	14,454,460.19	1,740,524.15	39.80097277	-80.64357139	
5,135.00	32.17	267.740	4,988.68	-67.33	-742.58	14,454,458.35	1,740,474.60	39.80096826	-80.64374784	
5,229.00	31.82	267.830	5,068.40	-69.25	-792.35	14,454,456.42	1,740,424.83	39.80096351	-80.64392506	
5,324.00	32.52	267.830	5,148.81	-71.17	-842.90	14,454,454.51	1,740,374.28	39.80095881	-80.64410505	
5,419.00	30.89	267.920	5,229.63	-73.02	-892.79	14,454,452.66	1,740,324.39	39.80095426	-80.64428271	
5,514.00	31.33	269.500	5,310.97	-74.12	-941.85	14,454,451.55	1,740,275.32	39.80095178	-80.64445742	
5,608.00	30.37	270.200	5,391.67	-74.25	-990.06	14,454,451.42	1,740,227.12	39.80095194	-80.64462904	
5,703.00	29.48	270.370	5,474.00	-74.01	-1,037.45	14,454,451.66	1,740,179.73	39.80095311	-80.64479777	
5,798.00	27.15	274.150	5,557.64	-72.29	-1,082.45	14,454,453.38	1,740,134.73	39.80095832	-80.64495797	
5,892.00	27.20	275.560	5,641.26	-68.66	-1,125.22	14,454,457.01	1,740,091.95	39.80096876	-80.64511021	
5,986.00	27.64	274.330	5,724.70	-64.93	-1,168.35	14,454,460.74	1,740,048.83	39.80097947	-80.64526370	
6,080.00	27.50	275.560	5,808.03	-61.18	-1,211.69	14,454,464.49	1,740,005.49	39.80099024	-80.64541796	
6,175.00	26.89	274.410	5,892.53	-57.41	-1,254.94	14,454,468.27	1,739,962.24	39.80100108	-80.64557190	
6,270.00	26.76	274.160	5,977.31	-54.20	-1,297.69	14,454,471.47	1,739,919.49	39.80101034	-80.64572406	
6,365.00	27.38	274.600	6,061.90	-50.90	-1,340.80	14,454,474.77	1,739,876.38	39.80101988	-80.64587749	
6,459.00	28.48	275.390	6,144.95	-47.06	-1,384.66	14,454,478.61	1,739,832.52	39.80103090	-80.64603359	
6,554.00	28.26	271.700	6,228.54	-44.27	-1,429.69	14,454,481.41	1,739,787.49	39.80103907	-80.64619389	
6,649.00	28.96	272.400	6,311.94	-42.64	-1,475.15	14,454,483.04	1,739,742.03	39.80104404	-80.64635572	
6,735.00	28.34	272.490	6,387.42	-40.88	-1,516.35	14,454,484.80	1,739,700.83	39.80104931	-80.64650237	
6,843.00	28.03	273.100	6,482.61	-38.39	-1,567.30	14,454,487.28	1,739,649.88	39.80105669	-80.64668374	
6,938.00	24.74	274.600	6,567.70	-35.59	-1,609.41	14,454,490.08	1,739,607.77	39.80106485	-80.64683365	
7,032.00	20.13	272.130	6,654.57	-33.41	-1,645.20	14,454,492.26	1,739,571.98	39.80107122	-80.64696104	
7,127.00	17.71	271.780	6,744.43	-32.35	-1,675.99	14,454,493.32	1,739,541.19	39.80107446	-80.64707063	
7,190.00	17.22	271.950	6,804.52	-31.74	-1,694.88	14,454,493.94	1,739,522.30	39.80107635	-80.64713790	
7,348.00	13.27	271.340	6,956.93	-30.52	-1,736.40	14,454,495.16	1,739,480.78	39.80108015	-80.64728571	
7,442.00	13.71	269.930	7,048.34	-30.28	-1,758.33	14,454,495.39	1,739,458.85	39.80108104	-80.64736377	
7,537.00	14.85	274.500	7,140.41	-29.34	-1,781.72	14,454,496.34	1,739,435.46	39.80108388	-80.64744705	
7,630.00	16.30	277.060	7,229.99	-26.80	-1,806.56	14,454,498.88	1,739,410.62	39.80109112	-80.64753544	
7,724.00	17.45	275.470	7,319.94	-23.83	-1,833.68	14,454,501.84	1,739,383.50	39.80109956	-80.64763196	
7,789.00	18.46	276.090	7,381.77	-21.81	-1,853.61	14,454,503.86	1,739,363.57	39.80110532	-80.64770291	
7,882.00	20.21	277.400	7,469.53	-18.18	-1,884.19	14,454,507.49	1,739,332.99	39.80111563	-80.64781171	
7,976.00	22.06	277.670	7,557.20	-13.73	-1,917.79	14,454,511.94	1,739,299.39	39.80112820	-80.64793127	
8,071.00	23.16	276.790	7,644.90	-9.14	-1,954.02	14,454,516.53	1,739,263.16	39.80114120	-80.64806021	
8,166.00	23.73	277.140	7,732.05	-4.56	-1,991.54	14,454,521.11	1,739,225.64	39.80115420	-80.64819372	
8,261.00	24.26	276.710	7,818.84	0.10	-2,029.89	14,454,525.77	1,739,187.29	39.80116740	-80.64833020	
8,355.00	27.33	279.070	7,903.47	5.76	-2,070.39	14,454,531.43	1,739,146.80	39.80118338	-80.64847431	
8,444.00	32.78	278.550	8,067.00	20.21	-2,163.89	14,454,545.89	1,739,053.29	39.80122409	-80.64880704	
8,639.00	32.87	276.880	8,146.83	27.13	-2,214.92	14,454,552.80	1,739,002.26	39.80124362	-80.64898862	
8,733.00	33.00	274.860	8,225.72	32.35	-2,265.75	14,454,558.02	1,738,951.43	39.80125851	-80.64916953	
8,828.00	33.31	273.980	8,305.26	36.35	-2,317.55	14,454,562.03	1,738,899.63	39.80127006	-80.64935391	
8,923.00	33.09	271.600	8,384.75	38.89	-2,369.50	14,454,564.56	1,738,847.68	39.80127758	-80.64953883	
9,017.00	32.51	271.080	8,463.77	40.08	-2,420.41	14,454,565.75	1,738,796.77	39.80128140	-80.64972006	
9,110.00	32.25	270.720	8,542.31	40.86	-2,470.21	14,454,566.54	1,738,746.98	39.80128409	-80.64989735	
9,204.00	31.77	269.670	8,622.01	41.04	-2,520.03	14,454,566.71	1,738,697.15	39.80128510	-80.65007474	
9,299.00	30.19	272.050	8,703.46	41.75	-2,568.92	14,454,567.42	1,738,648.27	39.80128757	-80.65024878	
9,394.00	29.22	272.570	8,785.98	43.64	-2,615.95	14,454,569.31	1,738,601.23	39.80129328	-80.65041622	
9,488.00	28.56	271.600	8,868.28	45.30	-2,661.33	14,454,570.97	1,738,555.85	39.80129832	-80.65057778	
9,582.00	30.54	276.180	8,950.06	48.50	-2,707.55	14,454,574.17	1,738,509.63	39.80130760	-80.65074228	
9,677.00	32.08	277.580	9,031.22	54.42	-2,756.56	14,454,580.10	1,738,460.63	39.80132440	-80.65091668	
9,771.00	32.56	277.580	9,110.66	61.05	-2,806.37	14,454,586.73	1,738,410.81	39.80134314	-80.65109396	
9,862.00	32.83	278.110	9,187.24	67.76	-2,855.07	14,454,593.44	1,738,362.11	39.80136209	-80.65126724	
9,956.00	32.17	274.510	9,266.53	73.32	-2,905.25	14,454,599.00	1,738,311.94	39.80137790	-80.65144582	
10,049.00	31.72	271.250	9,345.45	75.81	-2,954.37	14,454,601.48	1,738,262.81	39.80138524	-80.65162070	
10,144.00	31.81	271.950	9,426.22	77.20	-3,004.37	14,454,602.88	1,738,212.82	39.80138961	-80.65179867	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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	
10,239.00	30.94	271.960	9,507.33	78.89	-3,053.80	14,454,604.56	1,738,163.39	39.80139477	-80.65197464	
10,333.00	30.62	273.450	9,588.09	81.16	-3,101.84	14,454,606.83	1,738,115.34	39.80140151	-80.65214568	
10,427.00	31.20	271.430	9,668.74	83.20	-3,150.08	14,454,608.88	1,738,067.10	39.80140765	-80.65231739	
10,521.00	30.81	270.820	9,749.31	84.16	-3,198.49	14,454,609.83	1,738,018.69	39.80141078	-80.65248974	
10,616.00	31.46	271.520	9,830.62	85.16	-3,247.60	14,454,610.84	1,737,969.58	39.80141406	-80.65266458	
10,710.00	31.29	271.430	9,910.88	86.42	-3,296.52	14,454,612.10	1,737,920.66	39.80141804	-80.65283875	
10,805.00	32.21	273.270	9,991.66	88.48	-3,346.47	14,454,614.16	1,737,870.72	39.80142423	-80.65301653	
10,899.00	31.95	273.800	10,071.31	91.56	-3,396.29	14,454,617.23	1,737,820.89	39.80143321	-80.65319390	
10,994.00	32.61	274.680	10,151.63	95.31	-3,446.89	14,454,620.99	1,737,770.29	39.80144406	-80.65337399	
11,086.00	33.26	275.650	10,228.84	99.82	-3,496.70	14,454,625.49	1,737,720.48	39.80145697	-80.65355128	
11,181.00	32.43	276.000	10,308.66	105.05	-3,547.96	14,454,630.72	1,737,669.22	39.80147187	-80.65373371	
11,274.00	32.12	275.560	10,387.29	110.05	-3,597.37	14,454,635.72	1,737,619.81	39.80148613	-80.65390956	
11,369.00	32.78	276.350	10,467.45	115.34	-3,648.07	14,454,641.01	1,737,569.12	39.80150120	-80.65408998	
11,463.00	31.16	276.880	10,547.19	121.07	-3,697.50	14,454,646.74	1,737,519.68	39.80151746	-80.65426593	
11,556.00	29.88	278.550	10,627.31	127.40	-3,744.30	14,454,653.07	1,737,472.88	39.80153533	-80.65443246	
11,635.00	29.10	279.870	10,696.07	133.61	-3,782.69	14,454,659.29	1,737,434.50	39.80155281	-80.65458905	
11,682.00	28.70	278.290	10,737.22	137.20	-3,805.12	14,454,662.87	1,737,412.07	39.80156290	-80.65464885	
11,730.00	32.39	274.330	10,778.56	139.83	-3,829.35	14,454,665.51	1,737,387.83	39.80157039	-80.65473510	
11,777.00	35.99	271.430	10,817.43	141.13	-3,855.72	14,454,666.80	1,737,361.46	39.80157422	-80.65482896	
11,824.00	38.50	269.670	10,854.84	141.39	-3,884.16	14,454,667.06	1,737,333.02	39.80157524	-80.65493022	
11,871.00	42.67	271.080	10,890.53	141.61	-3,914.73	14,454,667.28	1,737,302.46	39.80157616	-80.65503905	
11,919.00	46.98	273.190	10,924.57	142.89	-3,948.53	14,454,668.56	1,737,268.66	39.80158004	-80.65515938	
11,966.00	50.89	273.720	10,955.44	145.03	-3,983.89	14,454,670.70	1,737,233.29	39.80158629	-80.65528526	
12,013.00	54.18	273.540	10,984.02	147.39	-4,021.12	14,454,673.06	1,737,196.07	39.80159317	-80.65541777	
12,060.00	57.17	271.870	11,010.52	149.21	-4,059.88	14,454,674.89	1,737,157.30	39.80159858	-80.65555576	
12,108.00	60.69	270.730	11,035.29	150.14	-4,100.98	14,454,675.81	1,737,116.20	39.80160155	-80.65570207	
12,155.00	63.90	269.760	11,057.14	150.31	-4,142.59	14,454,675.98	1,737,074.60	39.80160247	-80.65585020	
12,202.00	65.39	271.520	11,077.27	150.79	-4,185.05	14,454,676.46	1,737,032.13	39.80160423	-80.65600139	
12,249.00	67.20	273.190	11,096.16	152.56	-4,228.05	14,454,678.23	1,736,989.14	39.80160955	-80.65615444	
12,297.00	67.76	272.930	11,114.55	154.93	-4,272.32	14,454,680.60	1,736,944.86	39.80161652	-80.65631205	
12,344.00	67.89	271.430	11,132.29	156.58	-4,315.81	14,454,682.26	1,736,901.37	39.80162152	-80.65646688	
12,391.00	66.18	271.080	11,150.63	157.53	-4,359.08	14,454,683.20	1,736,858.11	39.80162458	-80.65662090	
12,438.00	66.88	272.830	11,169.35	159.00	-4,402.16	14,454,684.68	1,736,815.03	39.80162908	-80.65677428	
12,486.00	65.70	272.930	11,188.65	161.21	-4,446.05	14,454,686.89	1,736,771.13	39.80163561	-80.65693052	
12,533.00	65.57	273.630	11,208.04	163.66	-4,488.80	14,454,689.33	1,736,728.39	39.80164278	-80.65708267	
12,581.00	63.76	274.680	11,228.58	166.80	-4,532.06	14,454,692.47	1,736,685.12	39.80165186	-80.65723668	
12,628.00	64.07	273.190	11,249.24	169.70	-4,574.17	14,454,695.37	1,736,643.01	39.80166026	-80.65738657	
12,676.00	64.20	271.780	11,270.18	171.57	-4,617.32	14,454,697.24	1,736,599.86	39.80166585	-80.65754018	
12,723.00	64.38	271.260	11,290.57	172.69	-4,659.66	14,454,698.37	1,736,557.53	39.80166938	-80.65769088	
12,770.00	64.20	269.150	11,310.96	172.84	-4,702.00	14,454,698.52	1,736,515.19	39.80167024	-80.65784164	
12,817.00	64.78	267.120	11,331.21	171.46	-4,744.39	14,454,697.14	1,736,472.80	39.80166689	-80.65799260	
12,865.00	64.07	263.080	11,351.94	167.77	-4,787.52	14,454,693.44	1,736,429.67	39.80165720	-80.65814619	
12,912.00	61.39	256.670	11,373.49	160.46	-4,828.61	14,454,686.13	1,736,388.57	39.80163756	-80.65829262	
12,957.00	60.29	252.360	11,395.42	149.98	-4,866.47	14,454,675.65	1,736,350.71	39.80160918	-80.65842755	
13,006.00	59.68	247.880	11,419.94	135.56	-4,906.36	14,454,661.24	1,736,310.83	39.80157000	-80.65856976	
13,054.00	60.07	245.150	11,444.03	119.02	-4,944.43	14,454,644.69	1,736,272.76	39.80152496	-80.65870554	
13,101.00	59.90	243.220	11,467.55	101.30	-4,981.06	14,454,626.97	1,736,236.12	39.80147668	-80.65883621	
13,149.00	60.07	240.750	11,491.56	81.78	-5,017.75	14,454,607.45	1,736,199.43	39.80142346	-80.65896710	
13,196.00	60.29	236.980	11,514.94	60.70	-5,052.65	14,454,586.37	1,736,164.54	39.80136593	-80.65909161	
13,243.00	60.47	233.730	11,538.17	37.47	-5,086.25	14,454,563.15	1,736,130.94	39.80130251	-80.65921158	
13,290.00	60.07	229.770	11,561.49	12.22	-5,118.30	14,454,537.89	1,736,098.89	39.80123348	-80.65932601	
13,338.00	59.99	225.550	11,585.47	-15.78	-5,149.02	14,454,509.89	1,736,068.17	39.80115692	-80.65943579	
13,385.00	61.00	221.250	11,608.63	-45.50	-5,177.11	14,454,480.18	1,736,040.08	39.80107561	-80.65953620	
13,433.00	62.01	215.270	11,631.55	-78.60	-5,203.21	14,454,447.07	1,736,013.98	39.80098495	-80.65962956	
13,480.00	63.90	210.520	11,652.92	-113.74	-5,225.92	14,454,411.93	1,735,991.27	39.80088669	-80.65971090	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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	
13,527.00	65.08	209.120	11,673.17	-150.55	-5,247.01	14,454,375.13	1,735,970.18	39.80078784	-80.65978649	
13,584.00	65.86	207.270	11,696.83	-196.25	-5,271.51	14,454,329.43	1,735,945.68	39.80066259	-80.65987432	
13,638.00	65.60	202.880	11,719.04	-240.82	-5,292.36	14,454,284.86	1,735,924.82	39.80054040	-80.65994919	
13,685.00	66.57	198.310	11,738.10	-281.03	-5,307.46	14,454,244.65	1,735,909.72	39.80043015	-80.66000350	
13,732.00	68.24	193.030	11,756.17	-322.79	-5,319.17	14,454,202.89	1,735,898.02	39.80031558	-80.66004573	
13,783.00	69.80	188.900	11,774.43	-369.53	-5,328.21	14,454,156.15	1,735,888.97	39.80018732	-80.66007857	
13,830.00	70.95	185.650	11,790.22	-413.43	-5,333.81	14,454,112.24	1,735,883.37	39.80006680	-80.66009910	
13,878.00	72.00	182.490	11,805.48	-458.82	-5,337.04	14,454,066.85	1,735,880.15	39.79994218	-80.66011120	
13,909.00	72.97	180.290	11,814.81	-488.37	-5,337.76	14,454,037.30	1,735,879.43	39.79986104	-80.66011415	
13,941.00	74.46	178.970	11,823.78	-519.09	-5,337.56	14,454,006.59	1,735,879.63	39.79977669	-80.66011385	
13,966.00	76.26	178.880	11,830.10	-543.27	-5,337.10	14,453,982.40	1,735,880.09	39.79971027	-80.66011256	
14,013.00	79.38	175.100	11,840.02	-589.13	-5,334.68	14,453,936.54	1,735,882.51	39.79958429	-80.66010457	
14,043.00	81.32	170.180	11,845.05	-618.45	-5,330.89	14,453,907.22	1,735,886.30	39.79950373	-80.66009147	
14,061.00	82.99	167.540	11,847.51	-635.95	-5,327.44	14,453,889.73	1,735,889.74	39.79945565	-80.66007943	
14,108.00	84.40	163.330	11,852.67	-681.15	-5,315.70	14,453,844.53	1,735,901.49	39.79933140	-80.66003822	
14,156.00	87.82	159.630	11,855.93	-726.54	-5,300.49	14,453,799.13	1,735,916.70	39.79920658	-80.65998469	
14,203.00	90.77	154.890	11,856.51	-769.87	-5,282.33	14,453,755.81	1,735,934.86	39.79908740	-80.65992062	
14,250.00	91.56	150.760	11,855.55	-811.66	-5,260.87	14,453,714.01	1,735,956.32	39.79897240	-80.65984479	
14,297.00	90.37	148.030	11,854.76	-852.11	-5,236.95	14,453,673.57	1,735,980.24	39.79886109	-80.65976017	
14,345.00	88.79	148.030	11,855.11	-892.82	-5,211.54	14,453,632.85	1,736,005.65	39.79874900	-80.65967024	
14,440.00	88.62	148.650	11,857.26	-973.66	-5,161.69	14,453,552.01	1,736,055.50	39.79852648	-80.65949386	
14,534.00	87.60	147.150	11,860.36	-1,053.25	-5,111.76	14,453,472.43	1,736,105.42	39.79830740	-80.65931720	
14,628.00	87.96	147.070	11,864.00	-1,132.12	-5,060.76	14,453,393.56	1,736,156.43	39.79809026	-80.65913667	
14,723.00	88.13	147.070	11,867.24	-1,211.81	-5,009.14	14,453,313.87	1,736,208.04	39.79787087	-80.65895400	
14,818.00	88.18	147.150	11,870.30	-1,291.54	-4,957.58	14,453,234.13	1,736,259.60	39.79765137	-80.65877151	
14,912.00	89.05	147.940	11,872.57	-1,370.84	-4,907.16	14,453,154.84	1,736,310.03	39.79743308	-80.65859305	
15,007.00	89.27	147.420	11,873.96	-1,451.11	-4,856.37	14,453,074.57	1,736,360.82	39.79721210	-80.65841333	
15,102.00	89.58	146.980	11,874.92	-1,530.96	-4,804.91	14,452,994.72	1,736,412.28	39.79699228	-80.65823121	
15,196.00	89.67	147.860	11,875.53	-1,610.16	-4,754.30	14,452,915.51	1,736,462.89	39.79677423	-80.65805209	
15,291.00	89.41	148.650	11,876.29	-1,690.95	-4,704.31	14,452,834.73	1,736,512.87	39.79655185	-80.65787525	
15,385.00	89.93	149.440	11,876.84	-1,771.56	-4,655.96	14,452,754.12	1,736,561.22	39.79632997	-80.65770422	
15,480.00	88.04	150.050	11,878.52	-1,853.60	-4,608.11	14,452,672.08	1,736,609.08	39.79610416	-80.65753496	
15,574.00	88.48	149.440	11,881.37	-1,934.76	-4,560.77	14,452,590.92	1,736,656.42	39.79588078	-80.65736753	
15,669.00	89.19	149.350	11,883.30	-2,016.51	-4,512.41	14,452,509.17	1,736,704.77	39.79565577	-80.65719649	
15,763.00	89.05	149.440	11,884.75	-2,097.41	-4,464.56	14,452,428.27	1,736,752.62	39.79543311	-80.65702724	
15,857.00	89.10	149.090	11,886.26	-2,178.19	-4,416.53	14,452,347.49	1,736,800.66	39.79521075	-80.65685733	
15,952.00	89.32	148.740	11,887.57	-2,259.54	-4,367.48	14,452,266.14	1,736,849.70	39.79496682	-80.65668384	
16,046.00	89.01	150.230	11,888.94	-2,340.51	-4,319.76	14,452,185.17	1,736,897.43	39.79476396	-80.65651505	
16,139.00	88.97	149.700	11,890.58	-2,421.01	-4,273.22	14,452,104.67	1,736,943.97	39.79454240	-80.65635046	
16,234.00	88.92	148.650	11,892.33	-2,502.58	-4,224.55	14,452,023.10	1,736,992.64	39.79431789	-80.65617830	
16,329.00	88.79	149.260	11,894.23	-2,583.95	-4,175.57	14,451,941.73	1,737,041.62	39.79409389	-80.65600503	
16,423.00	89.05	149.260	11,896.00	-2,664.73	-4,127.53	14,451,860.95	1,737,089.66	39.79387155	-80.65583512	
16,517.00	89.54	149.970	11,897.16	-2,745.81	-4,079.98	14,451,779.87	1,737,137.20	39.79364838	-80.65566698	
16,611.00	89.45	149.970	11,897.99	-2,827.19	-4,032.94	14,451,698.49	1,737,184.24	39.79342440	-80.65550063	
16,706.00	89.36	151.810	11,898.97	-2,910.18	-3,986.73	14,451,615.50	1,737,230.45	39.79319599	-80.65533725	
16,801.00	88.04	150.930	11,901.13	-2,993.54	-3,941.23	14,451,532.14	1,737,275.96	39.79296658	-80.65517639	
16,896.00	87.74	151.280	11,904.63	-3,076.66	-3,895.35	14,451,449.02	1,737,321.83	39.79273784	-80.65501423	
16,990.00	88.22	151.110	11,907.94	-3,158.98	-3,850.09	14,451,366.70	1,737,367.10	39.79251130	-80.65485422	
17,085.00	88.18	150.670	11,910.93	-3,241.94	-3,803.90	14,451,283.74	1,737,413.29	39.79228298	-80.65469091	
17,177.00	88.62	150.490	11,913.49	-3,322.04	-3,758.72	14,451,203.64	1,737,458.46	39.79206252	-80.65453120	
17,271.00	89.01	150.230	11,915.44	-3,403.72	-3,712.24	14,451,121.96	1,737,504.94	39.79183771	-80.65436686	
17,365.00	88.57	149.880	11,917.42	-3,485.16	-3,665.33	14,451,040.53	1,737,551.85	39.79161358	-80.65420098	
17,459.00	88.84	149.180	11,919.55	-3,566.15	-3,617.68	14,450,959.53	1,737,599.50	39.79139063	-80.65403245	
17,554.00	89.10	149.090	11,921.26	-3,647.69	-3,568.95	14,450,878.00	1,737,648.23	39.79116621	-80.65386011	
17,649.00	89.23	149.000	11,922.64	-3,729.15	-3,520.09	14,450,796.54	1,737,697.09	39.79094198	-80.65368729	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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	
17,744.00	89.19	148.910	11,923.95	-3,810.53	-3,471.10	14,450,715.15	1,737,746.08	39.79071796	-80.65351402	
17,839.00	89.36	148.380	11,925.15	-3,891.65	-3,421.68	14,450,634.03	1,737,795.51	39.79049466	-80.65333919	
17,932.00	88.70	149.090	11,926.73	-3,971.13	-3,373.42	14,450,554.55	1,737,843.77	39.79027587	-80.65316849	
18,027.00	89.01	148.650	11,928.62	-4,052.43	-3,324.31	14,450,473.25	1,737,892.87	39.79005207	-80.65299481	
18,122.00	88.62	149.180	11,930.59	-4,133.78	-3,275.27	14,450,391.91	1,737,941.91	39.78982817	-80.65282136	
18,216.00	88.66	148.820	11,932.82	-4,214.33	-3,226.87	14,450,311.36	1,737,990.31	39.78960644	-80.65265018	
18,311.00	88.35	149.350	11,935.30	-4,295.80	-3,178.08	14,450,229.88	1,738,039.10	39.78938217	-80.65247762	
18,405.00	88.97	149.880	11,937.50	-4,376.87	-3,130.55	14,450,148.82	1,738,086.63	39.78915904	-80.65230953	
18,499.00	89.45	149.880	11,938.79	-4,458.17	-3,083.38	14,450,067.52	1,738,133.80	39.78893526	-80.65214276	
18,593.00	89.67	149.440	11,939.51	-4,539.29	-3,035.90	14,449,986.39	1,738,181.28	39.78871197	-80.65197486	
18,688.00	89.63	148.820	11,940.10	-4,620.83	-2,987.16	14,449,904.85	1,738,230.02	39.78848753	-80.65180248	
18,783.00	89.27	149.000	11,941.01	-4,702.18	-2,938.11	14,449,823.50	1,738,279.08	39.78826359	-80.65162898	
18,877.00	88.70	149.530	11,942.67	-4,782.96	-2,890.07	14,449,742.72	1,738,327.11	39.78804123	-80.65145912	
18,972.00	88.40	150.410	11,945.08	-4,865.18	-2,842.55	14,449,660.50	1,738,374.64	39.78781493	-80.65129108	
19,067.00	88.70	150.490	11,947.48	-4,947.80	-2,795.71	14,449,577.88	1,738,421.47	39.78758754	-80.65112550	
19,161.00	88.66	149.880	11,949.65	-5,029.34	-2,748.99	14,449,496.35	1,738,468.20	39.78736312	-80.65096030	
19,256.00	89.23	150.930	11,951.39	-5,111.93	-2,702.08	14,449,413.76	1,738,515.10	39.78713581	-80.65079447	
19,350.00	89.32	150.490	11,952.58	-5,193.90	-2,656.09	14,449,331.78	1,738,561.09	39.78691019	-80.65063192	
19,445.00	89.19	150.230	11,953.82	-5,276.46	-2,609.12	14,449,249.22	1,738,608.07	39.78668296	-80.65046584	
19,538.00	89.23	149.700	11,955.10	-5,356.97	-2,562.57	14,449,168.72	1,738,654.61	39.78646137	-80.65030128	
19,633.00	89.05	150.320	11,956.53	-5,439.24	-2,515.09	14,449,086.45	1,738,702.09	39.78623492	-80.65013341	
19,727.00	89.49	149.880	11,957.73	-5,520.72	-2,468.24	14,449,004.96	1,738,748.94	39.78601065	-80.64996776	
19,821.00	89.23	150.140	11,958.78	-5,602.13	-2,421.25	14,448,923.55	1,738,795.93	39.78578658	-80.64980165	
19,916.00	88.35	150.490	11,960.78	-5,684.64	-2,374.22	14,448,841.04	1,738,842.96	39.78555947	-80.64963537	
20,010.00	88.70	149.970	11,963.20	-5,766.21	-2,327.56	14,448,759.48	1,738,889.62	39.78533497	-80.64947043	
20,104.00	88.66	149.350	11,965.37	-5,847.31	-2,280.09	14,448,678.37	1,738,937.09	39.78511173	-80.64930259	
20,199.00	88.92	148.910	11,967.37	-5,928.84	-2,231.36	14,448,596.85	1,738,985.82	39.78488732	-80.64913026	
20,293.00	88.70	149.610	11,969.32	-6,009.61	-2,183.32	14,448,516.07	1,739,033.86	39.78466498	-80.64896040	
20,388.00	88.75	149.350	11,971.44	-6,091.43	-2,135.09	14,448,434.26	1,739,082.09	39.78443977	-80.64878985	
20,483.00	88.88	149.180	11,973.40	-6,173.07	-2,086.55	14,448,352.62	1,739,130.63	39.78421505	-80.64861821	
20,577.00	89.01	149.000	11,975.13	-6,253.70	-2,038.27	14,448,271.98	1,739,178.91	39.78399308	-80.64844749	
20,672.00	88.13	149.530	11,977.50	-6,335.33	-1,989.73	14,448,190.35	1,739,227.45	39.78376838	-80.64827586	
20,766.00	88.09	149.000	11,980.60	-6,416.09	-1,941.72	14,448,109.60	1,739,275.46	39.78354610	-80.64810609	
20,861.00	88.31	149.610	11,983.59	-6,497.74	-1,893.25	14,448,027.95	1,739,323.93	39.78332135	-80.64793470	
20,956.00	88.84	150.140	11,985.95	-6,579.88	-1,845.59	14,447,945.81	1,739,371.60	39.78309525	-80.64776619	
21,050.00	89.32	150.230	11,987.46	-6,661.43	-1,798.85	14,447,864.26	1,739,418.33	39.78287080	-80.64760100	
21,145.00	89.45	150.050	11,988.48	-6,743.81	-1,751.56	14,447,781.88	1,739,465.62	39.78264404	-80.64743380	
21,240.00	89.71	149.610	11,989.18	-6,825.94	-1,703.82	14,447,699.75	1,739,513.36	39.78241798	-80.64726502	
21,334.00	89.14	150.140	11,990.12	-6,907.24	-1,656.64	14,447,618.45	1,739,560.54	39.78219420	-80.64709824	
21,428.00	89.54	149.530	11,991.20	-6,988.50	-1,609.41	14,447,537.19	1,739,607.77	39.78197052	-80.64693127	
21,523.00	89.27	150.140	11,992.19	-7,070.63	-1,561.68	14,447,455.06	1,739,655.50	39.78174445	-80.64676252	
21,616.00	89.76	149.530	11,992.98	-7,151.03	-1,514.95	14,447,374.65	1,739,702.23	39.78152314	-80.64659732	
21,710.00	89.41	149.350	11,993.66	-7,231.98	-1,467.15	14,447,293.71	1,739,750.02	39.78130034	-80.64642835	
21,803.00	88.53	148.820	11,995.33	-7,311.75	-1,419.38	14,447,213.94	1,739,797.80	39.78108074	-80.64625943	
21,898.00	88.62	149.880	11,997.69	-7,393.45	-1,370.97	14,447,132.24	1,739,845.21	39.78085585	-80.64608825	
21,990.00	89.23	149.180	11,999.42	-7,472.73	-1,324.33	14,447,052.96	1,739,892.85	39.78063762	-80.64592335	
22,085.00	88.84	149.610	12,001.02	-7,554.48	-1,275.97	14,446,971.20	1,739,941.21	39.78041258	-80.64575238	
22,179.00	88.53	149.790	12,003.17	-7,635.62	-1,228.55	14,446,890.07	1,739,988.63	39.78018924	-80.64558476	
22,274.00	89.49	149.790	12,004.82	-7,717.71	-1,180.76	14,446,807.98	1,740,036.42	39.77996329	-80.64541580	
22,368.00	89.14	150.320	12,005.94	-7,799.15	-1,133.84	14,446,726.54	1,740,083.34	39.77973912	-80.64524996	
22,462.00	88.62	149.000	12,007.78	-7,880.26	-1,086.37	14,446,645.43	1,740,130.81	39.77951586	-80.64508213	
22,557.00	88.48	149.180	12,010.18	-7,961.74	-1,037.58	14,446,563.95	1,740,179.59	39.77929156	-80.64490964	
22,651.00	88.40	149.000	12,012.74	-8,042.36	-989.32	14,446,483.33	1,740,227.86	39.77906963	-80.64473898	
22,746.00	88.92	148.820	12,014.96	-8,123.69	-940.27	14,446,402.00	1,740,276.91	39.77884574	-80.64456557	
22,841.00	89.58	148.740	12,016.21	-8,204.93	-891.04	14,446,320.76	1,740,326.14	39.77862211	-80.64439148	

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Fitzgerald 17 HU (slot M)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Site:</b>	Fitzgerald	<b>MD Reference:</b>	RKB=1292.91+26 @ 1318.91ft (Nabors B28)
<b>Well:</b>	Fitzgerald 17 HU (slot M)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	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
22,935.00	89.93	147.860	12,016.61	-8,284.90	-841.64	14,446,240.79	1,740,375.54	39.77840194	-80.64421681
23,030.00	90.29	147.510	12,016.43	-8,365.19	-790.86	14,446,160.50	1,740,426.32	39.77818090	-80.64403719
23,091.00	90.46	147.510	12,016.03	-8,416.64	-758.09	14,446,109.05	1,740,459.09	39.77803925	-80.64392130
<b>Survey @ 23091.00 MD 12016.03 TVD</b>									
23,150.00	90.46	147.510	12,015.55	-8,466.40	-726.40	14,446,059.29	1,740,490.78	39.77790224	-80.64380921
<b>Survey projected to 23150.00 MD 12015.55 TVD</b>									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
198.00	198.00	-0.04	-0.24	MWD surveys
23,091.00	12,016.03	-8,416.64	-758.09	Survey @ 23091.00 MD 12016.03 TVD
23,150.00	12,015.55	-8,466.40	-726.40	Survey projected to 23150.00 MD 12015.55 TVD