



Well: Jeffersons N-08 HU (slot J)
 Site: Jeffersons
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Design: rev0
 Rig:

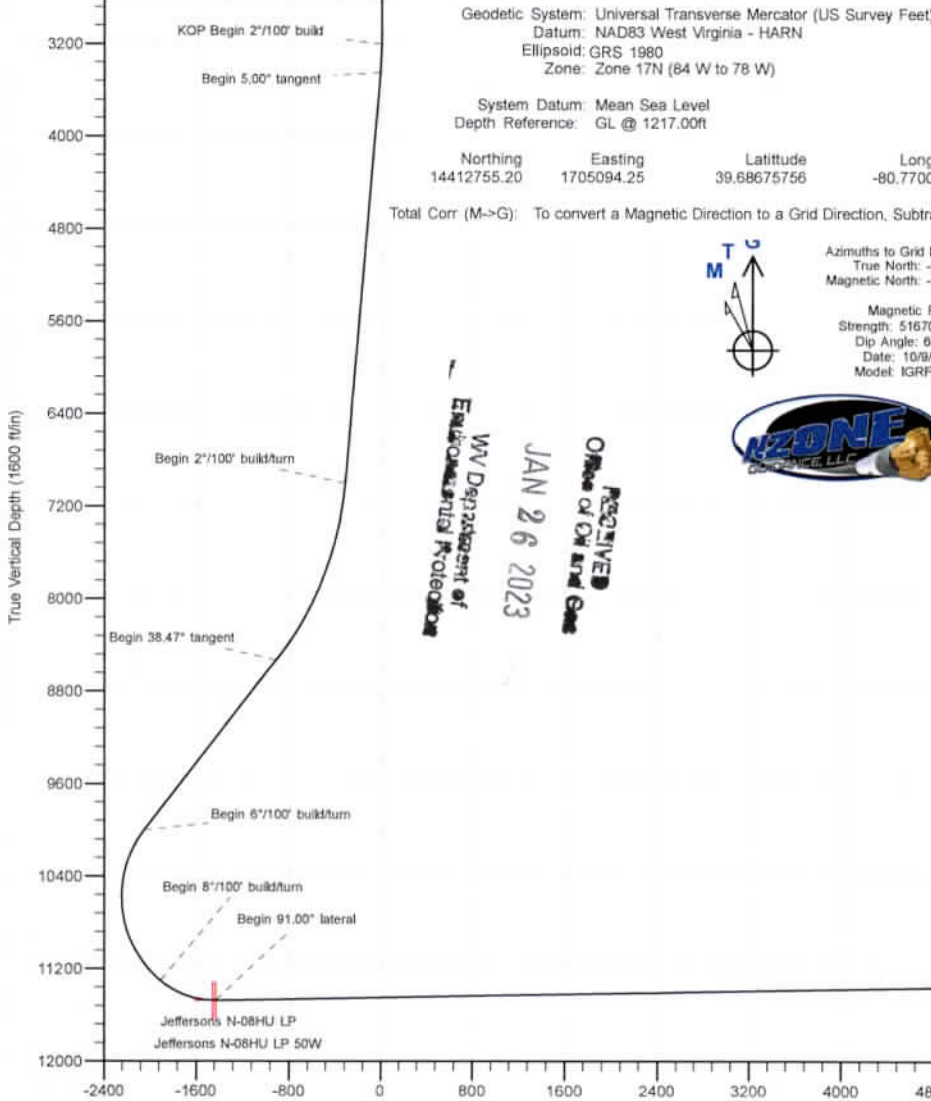
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Annotation
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	
3	3200.00	0.00	0.00	3200.00	0.00	0.00	0.00	0.000	0.00	KOP Begin 2°/100' build
3	3450.00	5.00	159.90	3449.68	-10.24	3.75	2.00	159.900	-10.63	Begin 5.00° tangent
4	7013.88	5.00	159.90	7000.00	-301.93	110.49	0.00	0.000	-313.57	Begin 2°/100' build/turn
5	8687.40	38.47	159.90	8532.53	-875.69	320.44	2.00	0.002	-909.43	Begin 38.47° tangent
6	10567.43	38.47	159.90	10004.46	-1974.05	722.34	0.00	0.000	-2050.10	Begin 6°/100' build/turn
7	12024.27	50.00	323.89	11305.74	-1942.43	505.40	6.00	167.789	-1905.81	Begin 8°/100' build/turn
8	12541.84	91.00	330.21	11475.00	-1540.05	248.76	8.00	9.582	-1428.56	Begin 91.00° lateral
9	24223.22	91.00	330.21	11271.00	8596.27	-5553.65	0.00	0.000	10234.20	PBHL/TD 24223.22 MD 11271.00 TVD

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
Jeffersons N-08HU BHL	11271.00	8596.27	-5553.65	14421351.45	1699540.60	39.71040300	-80.78976700
- plan hits target center							
Jeffersons N-08HU LP	11475.00	-1540.05	298.75	14411215.16	1705393.00	39.68252600	-80.76905000
- plan misses target center by 43.33ft at 12516.85ft MD (11475.00 TVD, -1561.71 N, 261.22 E)							
Jeffersons N-08HU LP 50W	11475.00	-1540.05	248.75	14411215.16	1705343.00	39.68252635	-80.76922771
- plan misses target center by 0.01ft at 12541.85ft MD (11475.00 TVD, -1540.04 N, 248.75 E)							

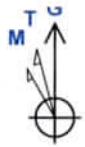
West(-)/East(+) (2400 ft/in)



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: GL @ 1217.00ft

Northing 14412755.20 Easting 1705094.25 Latitude 39.68675756 Longitude -80.77009783

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.750°

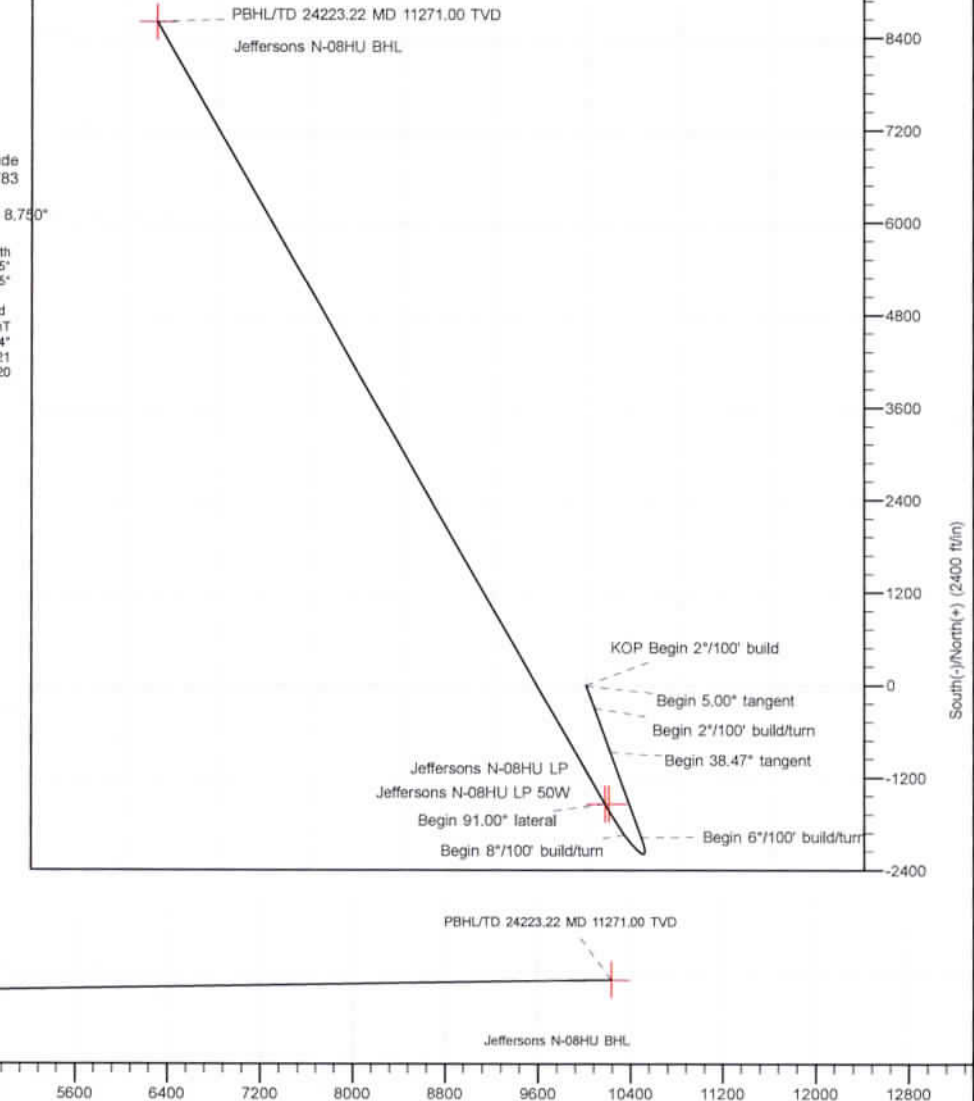


Azimuths to Grid North
 True North: -0.15°
 Magnetic North: -8.75°

Magnetic Field
 Strength: 51670.6nT
 Dip Angle: 66.44°
 Date: 10/9/2021
 Model: IGRF2020



RECEIVED
 Office of Oil and Gas
 JAN 26 2023
 WV Department of
 Environmental Protection



SM



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Project	Wetzel County, West Virginia (UTM17 NAD83)		
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	Jeffersons				
Site Position:		Northing:	14,412,666.05 usft	Latitude:	39.68651309
From:	Lat/Long	Easting:	1,705,043.41 usft	Longitude:	-80.77027935
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "		

Well	Jeffersons N-08 HU (slot J)					
Well Position	+N/-S	0.00 ft	Northing:	14,412,755.20 usft	Latitude:	39.68675756
	+E/-W	0.00 ft	Easting:	1,705,094.25 usft	Longitude:	-80.77009783
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	1,217.00 ft
Grid Convergence:						

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	10/9/2021	-8.603	66.437	51,669.99722882

Design	rev0			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	327.14

Plan Survey Tool Program	Date			
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	24,223.22 rev0 (Original Hole)		

RECEIVED
 Office of Oil and Gas
 JAN 26 2023
 WV Department of
 Environmental Protection



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.000	
3,450.00	5.00	159.90	3,449.68	-10.24	3.75	2.00	2.00	0.00	159.900	
7,013.88	5.00	159.90	7,000.00	-301.93	110.49	0.00	0.00	0.00	0.000	
8,687.40	38.47	159.90	8,532.53	-875.69	320.44	2.00	2.00	0.00	0.002	
10,567.43	38.47	159.90	10,004.46	-1,974.05	722.34	0.00	0.00	0.00	0.000	
12,024.27	50.00	323.89	11,305.74	-1,942.43	505.40	6.00	0.79	11.26	167.789	
12,541.84	91.00	330.21	11,475.00	-1,540.05	248.76	8.00	7.92	1.22	9.582	
24,223.22	91.00	330.21	11,271.00	8,596.27	-5,553.65	0.00	0.00	0.00	0.000	Jeffersons N-08HU BI

RECEIVED
 Office of Oil and Gas
 JAN 26 2023
 WV Department of Environmental Protection



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Planned 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	0.00	0.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
100.00	0.00	0.00	100.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
200.00	0.00	0.00	200.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
300.00	0.00	0.00	300.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
400.00	0.00	0.00	400.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
500.00	0.00	0.00	500.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
600.00	0.00	0.00	600.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
700.00	0.00	0.00	700.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
800.00	0.00	0.00	800.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
900.00	0.00	0.00	900.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,500.00	0.00	0.00	2,500.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,600.00	0.00	0.00	2,600.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,700.00	0.00	0.00	2,700.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,800.00	0.00	0.00	2,800.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
2,900.00	0.00	0.00	2,900.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
3,000.00	0.00	0.00	3,000.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
3,100.00	0.00	0.00	3,100.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
3,200.00	0.00	0.00	3,200.00	0.00	0.00	14,412,755.20	1,705,094.25	39.68675756	-80.77009783
KOP Begin 2°/100' build									
3,300.00	2.00	159.90	3,299.98	-1.64	0.60	14,412,753.56	1,705,094.85	39.68675306	-80.77009571
3,400.00	4.00	159.90	3,399.84	-6.55	2.40	14,412,748.65	1,705,096.84	39.68673955	-80.77008937
3,450.00	5.00	159.90	3,449.68	-10.24	3.75	14,412,744.96	1,705,097.99	39.68672942	-80.77008461
Begin 5.00° tangent									
3,500.00	5.00	159.90	3,499.49	-14.33	5.24	14,412,740.87	1,705,099.49	39.68671817	-80.77007932
3,600.00	5.00	159.90	3,599.11	-22.51	8.24	14,412,732.69	1,705,102.49	39.68669567	-80.77006875
3,700.00	5.00	159.90	3,698.73	-30.70	11.23	14,412,724.50	1,705,105.48	39.68667317	-80.77005818
3,800.00	5.00	159.90	3,798.35	-38.88	14.23	14,412,716.32	1,705,108.48	39.68665067	-80.77004761
3,900.00	5.00	159.90	3,897.97	-47.07	17.22	14,412,708.13	1,705,111.47	39.68662817	-80.77003703
4,000.00	5.00	159.90	3,997.59	-55.25	20.22	14,412,699.95	1,705,114.47	39.68660568	-80.77002646
4,100.00	5.00	159.90	4,097.21	-63.44	23.22	14,412,691.76	1,705,117.46	39.68658318	-80.77001589
4,200.00	5.00	159.90	4,196.83	-71.62	26.21	14,412,683.58	1,705,120.46	39.68656068	-80.77000532
4,300.00	5.00	159.90	4,296.45	-79.81	29.21	14,412,675.39	1,705,123.45	39.68653818	-80.76999475
4,400.00	5.00	159.90	4,396.07	-87.99	32.20	14,412,667.21	1,705,126.45	39.68651568	-80.76998417
4,500.00	5.00	159.90	4,495.69	-96.18	35.20	14,412,659.02	1,705,129.44	39.68649318	-80.76997360
4,600.00	5.00	159.90	4,595.31	-104.36	38.19	14,412,650.84	1,705,132.44	39.68647068	-80.76996303
4,700.00	5.00	159.90	4,694.93	-112.55	41.19	14,412,642.65	1,705,135.43	39.68644818	-80.76995246
4,800.00	5.00	159.90	4,794.55	-120.73	44.18	14,412,634.47	1,705,138.43	39.68642568	-80.76994189
4,900.00	5.00	159.90	4,894.17	-128.92	47.18	14,412,626.28	1,705,141.42	39.68640318	-80.76993131
5,000.00	5.00	159.90	4,993.78	-137.10	50.17	14,412,618.10	1,705,144.42	39.68638069	-80.76992074

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,100.00	5.00	159.90	5,093.40	-145.29	53.17	14,412,609.92	1,705,147.41	39.68635819	-80.76991017
5,200.00	5.00	159.90	5,193.02	-153.47	56.16	14,412,601.73	1,705,150.41	39.68633569	-80.76989960
5,300.00	5.00	159.90	5,292.64	-161.66	59.16	14,412,593.55	1,705,153.40	39.68631319	-80.76988903
5,400.00	5.00	159.90	5,392.26	-169.84	62.15	14,412,585.36	1,705,156.40	39.68629069	-80.76987845
5,500.00	5.00	159.90	5,491.88	-178.02	65.15	14,412,577.18	1,705,159.39	39.68626819	-80.76986788
5,600.00	5.00	159.90	5,591.50	-186.21	68.14	14,412,568.99	1,705,162.39	39.68624569	-80.76985731
5,700.00	5.00	159.90	5,691.12	-194.39	71.14	14,412,560.81	1,705,165.38	39.68622319	-80.76984674
5,800.00	5.00	159.90	5,790.74	-202.58	74.13	14,412,552.62	1,705,168.38	39.68620069	-80.76983617
5,900.00	5.00	159.90	5,890.36	-210.76	77.13	14,412,544.44	1,705,171.37	39.68617819	-80.76982560
6,000.00	5.00	159.90	5,989.98	-218.95	80.12	14,412,536.25	1,705,174.37	39.68615570	-80.76981502
6,100.00	5.00	159.90	6,089.60	-227.13	83.12	14,412,528.07	1,705,177.36	39.68613320	-80.76980445
6,200.00	5.00	159.90	6,189.22	-235.32	86.11	14,412,519.88	1,705,180.36	39.68611070	-80.76979388
6,300.00	5.00	159.90	6,288.84	-243.50	89.11	14,412,511.70	1,705,183.36	39.68608820	-80.76978331
6,400.00	5.00	159.90	6,388.46	-251.69	92.10	14,412,503.51	1,705,186.35	39.68606570	-80.76977274
6,500.00	5.00	159.90	6,488.08	-259.87	95.10	14,412,495.33	1,705,189.35	39.68604320	-80.76976216
6,600.00	5.00	159.90	6,587.70	-268.06	98.09	14,412,487.14	1,705,192.34	39.68602070	-80.76975159
6,700.00	5.00	159.90	6,687.32	-276.24	101.09	14,412,478.96	1,705,195.34	39.68599820	-80.76974102
6,800.00	5.00	159.90	6,786.94	-284.43	104.09	14,412,470.77	1,705,198.33	39.68597570	-80.76973045
6,900.00	5.00	159.90	6,886.55	-292.61	107.08	14,412,462.59	1,705,201.33	39.68595320	-80.76971988
7,000.00	5.00	159.90	6,986.17	-300.80	110.08	14,412,454.41	1,705,204.32	39.68593071	-80.76970931
7,013.88	5.00	159.90	7,000.00	-301.93	110.49	14,412,453.27	1,705,204.74	39.68592758	-80.76970784
Begin 2°/100' build/tum									
7,100.00	6.72	159.90	7,085.67	-310.19	113.51	14,412,445.01	1,705,207.76	39.68590488	-80.76969717
7,200.00	8.72	159.90	7,184.76	-322.81	118.13	14,412,432.39	1,705,212.38	39.68587019	-80.76968087
7,300.00	10.72	159.90	7,283.31	-338.67	123.93	14,412,416.53	1,705,218.18	39.68582660	-80.76966039
7,400.00	12.72	159.90	7,381.22	-357.75	130.92	14,412,397.46	1,705,225.16	39.68577416	-80.76963575
7,500.00	14.72	159.90	7,478.36	-380.02	139.07	14,412,375.18	1,705,233.31	39.68571292	-80.76960698
7,600.00	16.72	159.90	7,574.62	-405.47	148.38	14,412,349.73	1,705,242.62	39.68564297	-80.76957412
7,700.00	18.72	159.90	7,669.87	-434.05	158.84	14,412,321.15	1,705,253.08	39.68556439	-80.76953720
7,800.00	20.72	159.90	7,764.00	-465.74	170.43	14,412,289.46	1,705,264.68	39.68547728	-80.76949627
7,900.00	22.72	159.90	7,856.89	-500.50	183.15	14,412,254.70	1,705,277.40	39.68538174	-80.76945138
8,000.00	24.72	159.90	7,948.44	-538.28	196.97	14,412,216.92	1,705,291.22	39.68527789	-80.76940259
8,100.00	26.72	159.90	8,038.52	-579.03	211.89	14,412,176.17	1,705,306.13	39.68516586	-80.76934995
8,200.00	28.72	159.90	8,127.04	-622.72	227.87	14,412,132.48	1,705,322.12	39.68504578	-80.76929354
8,300.00	30.72	159.90	8,213.88	-669.28	244.91	14,412,085.93	1,705,339.15	39.68491779	-80.76923341
8,400.00	32.72	159.90	8,298.94	-718.65	262.98	14,412,036.55	1,705,357.22	39.68478206	-80.76916964
8,500.00	34.72	159.90	8,382.10	-770.79	282.05	14,411,984.42	1,705,376.30	39.68463875	-80.76910231
8,600.00	36.72	159.90	8,463.29	-825.61	302.11	14,411,929.59	1,705,396.36	39.68448803	-80.76903150
8,687.40	38.47	159.90	8,532.53	-875.69	320.44	14,411,879.51	1,705,414.68	39.68435039	-80.76896684
Begin 38.47° tangent									
8,700.00	38.47	159.90	8,542.40	-883.05	323.13	14,411,872.15	1,705,417.38	39.68433015	-80.76895733
8,800.00	38.47	159.90	8,620.69	-941.47	344.51	14,411,813.73	1,705,438.75	39.68416955	-80.76888188
8,900.00	38.47	159.90	8,698.98	-999.89	365.88	14,411,755.31	1,705,460.13	39.68400895	-80.76880643
9,000.00	38.47	159.90	8,777.28	-1,058.32	387.26	14,411,696.89	1,705,481.51	39.68384836	-80.76873098
9,100.00	38.47	159.90	8,855.57	-1,116.74	408.64	14,411,638.46	1,705,502.88	39.68368776	-80.76865553
9,200.00	38.47	159.90	8,933.86	-1,175.16	430.02	14,411,580.04	1,705,524.26	39.68352716	-80.76858009
9,300.00	38.47	159.90	9,012.16	-1,233.59	451.39	14,411,521.62	1,705,545.64	39.68336656	-80.76850464
9,400.00	38.47	159.90	9,090.45	-1,292.01	472.77	14,411,463.20	1,705,567.02	39.68320596	-80.76842919
9,500.00	38.47	159.90	9,168.74	-1,350.43	494.15	14,411,404.77	1,705,588.39	39.68304536	-80.76835374
9,600.00	38.47	159.90	9,247.03	-1,408.85	515.53	14,411,346.35	1,705,609.77	39.68288476	-80.76827830
9,700.00	38.47	159.90	9,325.33	-1,467.28	536.90	14,411,287.93	1,705,631.15	39.68272416	-80.76820285
9,800.00	38.47	159.90	9,403.62	-1,525.70	558.28	14,411,229.50	1,705,652.53	39.68256356	-80.76812740
9,900.00	38.47	159.90	9,481.91	-1,584.12	579.66	14,411,171.08	1,705,673.90	39.68240296	-80.76805196
10,000.00	38.47	159.90	9,560.21	-1,642.55	601.04	14,411,112.66	1,705,695.28	39.68224237	-80.76797651



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,100.00	38.47	159.90	9,638.50	-1,700.97	622.41	14,411,054.24	1,705,716.66	39.68208177	-80.76790107
10,200.00	38.47	159.90	9,716.79	-1,759.39	643.79	14,410,995.81	1,705,738.04	39.68192117	-80.76782562
10,300.00	38.47	159.90	9,795.08	-1,817.81	665.17	14,410,937.39	1,705,759.41	39.68176057	-80.76775018
10,400.00	38.47	159.90	9,873.38	-1,876.24	686.55	14,410,878.97	1,705,780.79	39.68159997	-80.76767473
10,500.00	38.47	159.90	9,951.67	-1,934.66	707.92	14,410,820.55	1,705,802.17	39.68143937	-80.76759929
10,567.43	38.47	159.90	10,004.46	-1,974.05	722.34	14,410,781.15	1,705,816.58	39.68133107	-80.76754842
Begin 6°/100' build/turm									
10,600.00	36.56	160.60	10,030.30	-1,992.72	729.04	14,410,762.49	1,705,823.29	39.68127977	-80.76752476
10,650.00	33.64	161.79	10,071.20	-2,019.93	738.32	14,410,735.28	1,705,832.57	39.68120497	-80.76749204
10,700.00	30.74	163.19	10,113.51	-2,045.32	746.35	14,410,709.88	1,705,840.59	39.68113518	-80.76746374
10,750.00	27.85	164.84	10,157.11	-2,068.83	753.10	14,410,686.38	1,705,847.34	39.68107057	-80.76743996
10,800.00	24.98	166.84	10,201.89	-2,090.39	758.56	14,410,664.82	1,705,852.80	39.68101133	-80.76742076
10,850.00	22.15	169.32	10,247.72	-2,109.93	762.71	14,410,645.27	1,705,856.95	39.68095762	-80.76740618
10,900.00	19.36	172.48	10,294.47	-2,127.42	765.54	14,410,627.79	1,705,859.79	39.68090958	-80.76739627
10,950.00	16.65	176.63	10,342.02	-2,142.79	767.05	14,410,612.42	1,705,861.29	39.68086736	-80.76739106
11,000.00	14.05	182.31	10,390.23	-2,156.01	767.22	14,410,599.20	1,705,861.47	39.68083105	-80.76739056
11,050.00	11.64	190.39	10,438.98	-2,167.04	766.07	14,410,588.17	1,705,860.31	39.68080076	-80.76739477
11,100.00	9.57	202.24	10,488.13	-2,175.85	763.59	14,410,579.35	1,705,857.83	39.68077658	-80.76740367
11,150.00	8.09	219.37	10,537.54	-2,182.42	759.78	14,410,572.79	1,705,854.03	39.68075858	-80.76741725
11,200.00	7.56	241.20	10,587.09	-2,186.72	754.67	14,410,568.48	1,705,848.91	39.68074679	-80.76743548
11,250.00	8.18	262.79	10,636.63	-2,188.75	748.25	14,410,566.45	1,705,842.50	39.68074125	-80.76745829
11,300.00	9.72	279.46	10,686.03	-2,188.51	740.56	14,410,566.70	1,705,834.81	39.68074199	-80.76748562
11,350.00	11.83	290.95	10,735.15	-2,185.98	731.61	14,410,569.22	1,705,825.86	39.68074899	-80.76751741
11,400.00	14.26	298.79	10,783.86	-2,181.18	721.43	14,410,574.02	1,705,815.67	39.68076224	-80.76755355
11,450.00	16.87	304.32	10,832.02	-2,174.13	710.04	14,410,581.08	1,705,804.29	39.68078170	-80.76759397
11,500.00	19.59	308.38	10,879.51	-2,164.83	697.48	14,410,590.37	1,705,791.72	39.68080731	-80.76763854
11,550.00	22.37	311.47	10,926.20	-2,153.32	683.77	14,410,601.88	1,705,778.02	39.68083902	-80.76768713
11,600.00	25.21	313.91	10,971.94	-2,139.63	668.97	14,410,615.57	1,705,763.21	39.68087672	-80.76773963
11,650.00	28.08	315.88	11,016.63	-2,123.80	653.10	14,410,631.41	1,705,747.35	39.68092032	-80.76779588
11,700.00	30.97	317.51	11,060.13	-2,105.86	636.22	14,410,649.34	1,705,730.46	39.68096970	-80.76785573
11,750.00	33.88	318.88	11,102.33	-2,085.87	618.36	14,410,669.33	1,705,712.60	39.68102472	-80.76791902
11,800.00	36.80	320.06	11,143.12	-2,063.89	599.58	14,410,691.32	1,705,693.82	39.68108523	-80.76798557
11,850.00	39.73	321.09	11,182.37	-2,039.97	579.92	14,410,715.24	1,705,674.17	39.68115107	-80.76805521
11,900.00	42.67	322.01	11,219.99	-2,014.17	559.45	14,410,741.03	1,705,653.70	39.68122205	-80.76812773
11,950.00	45.61	322.82	11,255.87	-1,986.58	538.22	14,410,768.62	1,705,632.47	39.68129798	-80.76820294
12,000.00	48.57	323.56	11,289.91	-1,957.26	516.28	14,410,797.94	1,705,610.53	39.68137866	-80.76828064
12,024.27	50.00	323.89	11,305.74	-1,942.43	505.40	14,410,812.77	1,705,599.65	39.68141947	-80.76831919
Begin 8°/100' build/turm									
12,050.00	52.03	324.32	11,321.93	-1,926.23	493.68	14,410,828.98	1,705,587.92	39.68146404	-80.76836071
12,100.00	55.98	325.10	11,351.31	-1,893.21	470.32	14,410,861.99	1,705,564.56	39.68155489	-80.76844342
12,150.00	59.93	325.81	11,377.83	-1,858.30	446.30	14,410,896.90	1,705,540.54	39.68165092	-80.76852848
12,200.00	63.89	326.47	11,401.36	-1,821.68	421.73	14,410,933.53	1,705,515.98	39.68175169	-80.76861546
12,250.00	67.85	327.08	11,421.80	-1,783.51	396.74	14,410,971.70	1,705,490.98	39.68185668	-80.76870394
12,300.00	71.82	327.66	11,439.03	-1,743.99	371.44	14,411,011.22	1,705,465.69	39.68196540	-80.76879350
12,350.00	75.78	328.22	11,452.98	-1,703.30	345.96	14,411,051.90	1,705,440.21	39.68207732	-80.76888369
12,400.00	79.75	328.75	11,463.57	-1,661.65	320.42	14,411,093.55	1,705,414.67	39.68219188	-80.76897408
12,450.00	83.71	329.27	11,470.76	-1,619.24	294.95	14,411,135.96	1,705,389.20	39.68230853	-80.76906422
12,500.00	87.68	329.78	11,474.51	-1,576.28	269.68	14,411,178.92	1,705,363.92	39.68242670	-80.76915367
12,541.84	91.00	330.21	11,475.00	-1,540.05	248.76	14,411,215.15	1,705,343.00	39.68252634	-80.76922769
Begin 91.00° lateral									
12,600.00	91.00	330.21	11,473.98	-1,489.59	219.87	14,411,265.62	1,705,314.11	39.68266514	-80.76932991
12,700.00	91.00	330.21	11,472.23	-1,402.81	170.20	14,411,352.39	1,705,264.44	39.68290380	-80.76950567
12,800.00	91.00	330.21	11,470.49	-1,316.04	120.52	14,411,439.16	1,705,214.77	39.68314245	-80.76968143
12,900.00	91.00	330.21	11,468.74	-1,229.27	70.85	14,411,525.94	1,705,165.10	39.68338111	-80.76985719



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
13,000.00	91.00	330.21	11,467.00	-1,142.49	21.18	14,411,612.71	1,705,115.43	39.68361977	-80.77003296	
13,100.00	91.00	330.21	11,465.25	-1,055.72	-28.49	14,411,699.48	1,705,065.75	39.68385842	-80.77020872	
13,200.00	91.00	330.21	11,463.50	-968.95	-78.17	14,411,786.26	1,705,016.08	39.68409708	-80.77038449	
13,300.00	91.00	330.21	11,461.76	-882.17	-127.84	14,411,873.03	1,704,966.41	39.68433574	-80.77056025	
13,400.00	91.00	330.21	11,460.01	-795.40	-177.51	14,411,959.80	1,704,916.74	39.68457439	-80.77073602	
13,500.00	91.00	330.21	11,458.26	-708.63	-227.18	14,412,046.58	1,704,867.06	39.68481305	-80.77091179	
13,600.00	91.00	330.21	11,456.52	-621.85	-276.85	14,412,133.35	1,704,817.39	39.68505170	-80.77108756	
13,700.00	91.00	330.21	11,454.77	-535.08	-326.53	14,412,220.12	1,704,767.72	39.68529036	-80.77126334	
13,800.00	91.00	330.21	11,453.02	-448.31	-376.20	14,412,306.90	1,704,718.05	39.68552901	-80.77143911	
13,900.00	91.00	330.21	11,451.28	-361.53	-425.87	14,412,393.67	1,704,668.38	39.68576766	-80.77161489	
14,000.00	91.00	330.21	11,449.53	-274.76	-475.54	14,412,480.44	1,704,618.70	39.68600632	-80.77179066	
14,100.00	91.00	330.21	11,447.79	-187.99	-525.22	14,412,567.21	1,704,569.03	39.68624497	-80.77196644	
14,200.00	91.00	330.21	11,446.04	-101.21	-574.89	14,412,653.99	1,704,519.36	39.68648363	-80.77214222	
14,300.00	91.00	330.21	11,444.29	-14.44	-624.56	14,412,740.76	1,704,469.69	39.68672228	-80.77231800	
14,400.00	91.00	330.21	11,442.55	72.33	-674.23	14,412,827.53	1,704,420.01	39.68696093	-80.77249378	
14,500.00	91.00	330.21	11,440.80	159.11	-723.91	14,412,914.31	1,704,370.34	39.68719958	-80.77266956	
14,600.00	91.00	330.21	11,439.05	245.88	-773.58	14,413,001.08	1,704,320.67	39.68743824	-80.77284534	
14,700.00	91.00	330.21	11,437.31	332.65	-823.25	14,413,087.85	1,704,271.00	39.68767689	-80.77302113	
14,800.00	91.00	330.21	11,435.56	419.43	-872.92	14,413,174.63	1,704,221.33	39.68791554	-80.77319691	
14,900.00	91.00	330.21	11,433.81	506.20	-922.59	14,413,261.40	1,704,171.65	39.68815419	-80.77337270	
15,000.00	91.00	330.21	11,432.07	592.97	-972.27	14,413,348.17	1,704,121.98	39.68839284	-80.77354849	
15,100.00	91.00	330.21	11,430.32	679.75	-1,021.94	14,413,434.95	1,704,072.31	39.68863150	-80.77372428	
15,200.00	91.00	330.21	11,428.58	766.52	-1,071.61	14,413,521.72	1,704,022.64	39.68887015	-80.77390007	
15,300.00	91.00	330.21	11,426.83	853.29	-1,121.28	14,413,608.49	1,703,972.96	39.68910880	-80.77407586	
15,400.00	91.00	330.21	11,425.08	940.07	-1,170.96	14,413,695.27	1,703,923.29	39.68934745	-80.77425165	
15,500.00	91.00	330.21	11,423.34	1,026.84	-1,220.63	14,413,782.04	1,703,873.62	39.68958610	-80.77442745	
15,600.00	91.00	330.21	11,421.59	1,113.61	-1,270.30	14,413,868.81	1,703,823.95	39.68982475	-80.77460324	
15,700.00	91.00	330.21	11,419.84	1,200.39	-1,319.97	14,413,955.59	1,703,774.28	39.69006340	-80.77477904	
15,800.00	91.00	330.21	11,418.10	1,287.16	-1,369.65	14,414,042.36	1,703,724.60	39.69030204	-80.77495484	
15,900.00	91.00	330.21	11,416.35	1,373.93	-1,419.32	14,414,129.13	1,703,674.93	39.69054069	-80.77513063	
16,000.00	91.00	330.21	11,414.61	1,460.71	-1,468.99	14,414,215.90	1,703,625.26	39.69077934	-80.77530643	
16,100.00	91.00	330.21	11,412.86	1,547.48	-1,518.66	14,414,302.68	1,703,575.59	39.69101799	-80.77548224	
16,200.00	91.00	330.21	11,411.11	1,634.25	-1,568.34	14,414,389.45	1,703,525.91	39.69125664	-80.77565804	
16,300.00	91.00	330.21	11,409.37	1,721.03	-1,618.01	14,414,476.22	1,703,476.24	39.69149529	-80.77583384	
16,400.00	91.00	330.21	11,407.62	1,807.80	-1,667.68	14,414,563.00	1,703,426.57	39.69173393	-80.77600965	
16,500.00	91.00	330.21	11,405.87	1,894.57	-1,717.35	14,414,649.77	1,703,376.90	39.69197258	-80.77618545	
16,600.00	91.00	330.21	11,404.13	1,981.35	-1,767.02	14,414,736.54	1,703,327.23	39.69221123	-80.77636126	
16,700.00	91.00	330.21	11,402.38	2,068.12	-1,816.70	14,414,823.32	1,703,277.55	39.69244987	-80.77653707	
16,800.00	91.00	330.21	11,400.63	2,154.89	-1,866.37	14,414,910.09	1,703,227.88	39.69268852	-80.77671288	
16,900.00	91.00	330.21	11,398.89	2,241.67	-1,916.04	14,414,996.86	1,703,178.21	39.69292717	-80.77688869	
17,000.00	91.00	330.21	11,397.14	2,328.44	-1,965.71	14,415,083.64	1,703,128.54	39.69316581	-80.77706450	
17,100.00	91.00	330.21	11,395.40	2,415.21	-2,015.39	14,415,170.41	1,703,078.86	39.69340446	-80.77724032	
17,200.00	91.00	330.21	11,393.65	2,501.99	-2,065.06	14,415,257.18	1,703,029.19	39.69364310	-80.77741613	
17,300.00	91.00	330.21	11,391.90	2,588.76	-2,114.73	14,415,343.96	1,702,979.52	39.69388175	-80.77759195	
17,400.00	91.00	330.21	11,390.16	2,675.53	-2,164.40	14,415,430.73	1,702,929.85	39.69412039	-80.77776776	
17,500.00	91.00	330.21	11,388.41	2,762.31	-2,214.08	14,415,517.50	1,702,880.18	39.69435904	-80.77794358	
17,600.00	91.00	330.21	11,386.66	2,849.08	-2,263.75	14,415,604.28	1,702,830.50	39.69459768	-80.77811940	
17,700.00	91.00	330.21	11,384.92	2,935.85	-2,313.42	14,415,691.05	1,702,780.83	39.69483633	-80.77829522	
17,800.00	91.00	330.21	11,383.17	3,022.63	-2,363.09	14,415,777.82	1,702,731.16	39.69507497	-80.77847104	
17,900.00	91.00	330.21	11,381.42	3,109.40	-2,412.76	14,415,864.59	1,702,681.49	39.69531361	-80.77864687	
18,000.00	91.00	330.21	11,379.68	3,196.17	-2,462.44	14,415,951.37	1,702,631.81	39.69555226	-80.77882269	
18,100.00	91.00	330.21	11,377.93	3,282.95	-2,512.11	14,416,038.14	1,702,582.14	39.69579090	-80.77899852	
18,200.00	91.00	330.21	11,376.19	3,369.72	-2,561.78	14,416,124.91	1,702,532.47	39.69602954	-80.77917434	
18,300.00	91.00	330.21	11,374.44	3,456.49	-2,611.45	14,416,211.69	1,702,482.80	39.69626818	-80.77935017	
18,400.00	91.00	330.21	11,372.69	3,543.27	-2,661.13	14,416,298.46	1,702,433.13	39.69650683	-80.77952600	



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
18,500.00	91.00	330.21	11,370.95	3,630.04	-2,710.80	14,416,385.23	1,702,383.45	39.69674547	-80.77970183	
18,600.00	91.00	330.21	11,369.20	3,716.81	-2,760.47	14,416,472.01	1,702,333.78	39.69698411	-80.77987766	
18,700.00	91.00	330.21	11,367.45	3,803.59	-2,810.14	14,416,558.78	1,702,284.11	39.69722275	-80.78005350	
18,800.00	91.00	330.21	11,365.71	3,890.36	-2,859.82	14,416,645.55	1,702,234.44	39.69746139	-80.78022933	
18,900.00	91.00	330.21	11,363.96	3,977.13	-2,909.49	14,416,732.33	1,702,184.76	39.69770003	-80.78040516	
19,000.00	91.00	330.21	11,362.22	4,063.91	-2,959.16	14,416,819.10	1,702,135.09	39.69793867	-80.78058100	
19,100.00	91.00	330.21	11,360.47	4,150.68	-3,008.83	14,416,905.87	1,702,085.42	39.69817731	-80.78075684	
19,200.00	91.00	330.21	11,358.72	4,237.45	-3,058.51	14,416,992.65	1,702,035.75	39.69841595	-80.78093268	
19,300.00	91.00	330.21	11,356.98	4,324.23	-3,108.18	14,417,079.42	1,701,986.08	39.69865459	-80.78110852	
19,400.00	91.00	330.21	11,355.23	4,411.00	-3,157.85	14,417,166.19	1,701,936.40	39.69889323	-80.78128436	
19,500.00	91.00	330.21	11,353.48	4,497.77	-3,207.52	14,417,252.97	1,701,886.73	39.69913187	-80.78146020	
19,600.00	91.00	330.21	11,351.74	4,584.55	-3,257.19	14,417,339.74	1,701,837.06	39.69937051	-80.78163604	
19,700.00	91.00	330.21	11,349.99	4,671.32	-3,306.87	14,417,426.51	1,701,787.39	39.69960915	-80.78181189	
19,800.00	91.00	330.21	11,348.24	4,758.09	-3,356.54	14,417,513.28	1,701,737.71	39.69984779	-80.78198774	
19,900.00	91.00	330.21	11,346.50	4,844.87	-3,406.21	14,417,600.06	1,701,688.04	39.70008642	-80.78216356	
20,000.00	91.00	330.21	11,344.75	4,931.64	-3,455.88	14,417,686.83	1,701,638.37	39.70032506	-80.78233943	
20,100.00	91.00	330.21	11,343.01	5,018.41	-3,505.56	14,417,773.60	1,701,588.70	39.70056370	-80.78251528	
20,200.00	91.00	330.21	11,341.26	5,105.19	-3,555.23	14,417,860.38	1,701,539.02	39.70080234	-80.78269113	
20,300.00	91.00	330.21	11,339.51	5,191.96	-3,604.90	14,417,947.15	1,701,489.35	39.70104097	-80.78286698	
20,400.00	91.00	330.21	11,337.77	5,278.73	-3,654.57	14,418,033.92	1,701,439.68	39.70127961	-80.78304284	
20,500.00	91.00	330.21	11,336.02	5,365.51	-3,704.25	14,418,120.70	1,701,390.01	39.70151824	-80.78321869	
20,600.00	91.00	330.21	11,334.27	5,452.28	-3,753.92	14,418,207.47	1,701,340.34	39.70175688	-80.78339455	
20,700.00	91.00	330.21	11,332.53	5,539.05	-3,803.59	14,418,294.24	1,701,290.66	39.70199552	-80.78357040	
20,800.00	91.00	330.21	11,330.78	5,625.83	-3,853.26	14,418,381.02	1,701,240.99	39.70223415	-80.78374626	
20,900.00	91.00	330.21	11,329.03	5,712.60	-3,902.93	14,418,467.79	1,701,191.32	39.70247279	-80.78392212	
21,000.00	91.00	330.21	11,327.29	5,799.37	-3,952.61	14,418,554.56	1,701,141.65	39.70271142	-80.78409798	
21,100.00	91.00	330.21	11,325.54	5,886.15	-4,002.28	14,418,641.34	1,701,091.97	39.70295006	-80.78427384	
21,200.00	91.00	330.21	11,323.80	5,972.92	-4,051.95	14,418,728.11	1,701,042.30	39.70318869	-80.78444971	
21,300.00	91.00	330.21	11,322.05	6,059.69	-4,101.62	14,418,814.88	1,700,992.63	39.70342733	-80.78462557	
21,400.00	91.00	330.21	11,320.30	6,146.47	-4,151.30	14,418,901.66	1,700,942.96	39.70366596	-80.78480144	
21,500.00	91.00	330.21	11,318.56	6,233.24	-4,200.97	14,418,988.43	1,700,893.29	39.70390459	-80.78497730	
21,600.00	91.00	330.21	11,316.81	6,320.01	-4,250.64	14,419,075.20	1,700,843.61	39.70414323	-80.78515317	
21,700.00	91.00	330.21	11,315.06	6,406.79	-4,300.31	14,419,161.97	1,700,793.94	39.70438186	-80.78532904	
21,800.00	91.00	330.21	11,313.32	6,493.56	-4,349.99	14,419,248.75	1,700,744.27	39.70462049	-80.78550491	
21,900.00	91.00	330.21	11,311.57	6,580.33	-4,399.66	14,419,335.52	1,700,694.60	39.70485912	-80.78568078	
22,000.00	91.00	330.21	11,309.83	6,667.11	-4,449.33	14,419,422.29	1,700,644.92	39.70509776	-80.78585666	
22,100.00	91.00	330.21	11,308.08	6,753.88	-4,499.00	14,419,509.07	1,700,595.25	39.70533639	-80.78603253	
22,200.00	91.00	330.21	11,306.33	6,840.65	-4,548.67	14,419,595.84	1,700,545.58	39.70557502	-80.78620840	
22,300.00	91.00	330.21	11,304.59	6,927.43	-4,598.35	14,419,682.61	1,700,495.91	39.70581365	-80.78638428	
22,400.00	91.00	330.21	11,302.84	7,014.20	-4,648.02	14,419,769.39	1,700,446.24	39.70605228	-80.78656016	
22,500.00	91.00	330.21	11,301.09	7,100.97	-4,697.69	14,419,856.16	1,700,396.56	39.70629091	-80.78673604	
22,600.00	91.00	330.21	11,299.35	7,187.75	-4,747.36	14,419,942.93	1,700,346.89	39.70652954	-80.78691192	
22,700.00	91.00	330.21	11,297.60	7,274.52	-4,797.04	14,420,029.71	1,700,297.22	39.70676817	-80.78708780	
22,800.00	91.00	330.21	11,295.85	7,361.29	-4,846.71	14,420,116.48	1,700,247.55	39.70700680	-80.78726368	
22,900.00	91.00	330.21	11,294.11	7,448.07	-4,896.38	14,420,203.25	1,700,197.87	39.70724543	-80.78743956	
23,000.00	91.00	330.21	11,292.36	7,534.84	-4,946.05	14,420,290.03	1,700,148.20	39.70748406	-80.78761545	
23,100.00	91.00	330.21	11,290.62	7,621.61	-4,995.73	14,420,376.80	1,700,098.53	39.70772269	-80.78779133	
23,200.00	91.00	330.21	11,288.87	7,708.39	-5,045.40	14,420,463.57	1,700,048.86	39.70796132	-80.78796722	
23,300.00	91.00	330.21	11,287.12	7,795.16	-5,095.07	14,420,550.35	1,699,999.19	39.70819995	-80.78814311	
23,400.00	91.00	330.21	11,285.38	7,881.93	-5,144.74	14,420,637.12	1,699,949.51	39.70843858	-80.78831900	
23,500.00	91.00	330.21	11,283.63	7,968.71	-5,194.42	14,420,723.89	1,699,899.84	39.70867721	-80.78849489	
23,600.00	91.00	330.21	11,281.88	8,055.48	-5,244.09	14,420,810.66	1,699,850.17	39.70891583	-80.78867078	
23,700.00	91.00	330.21	11,280.14	8,142.25	-5,293.76	14,420,897.44	1,699,800.50	39.70915446	-80.78884668	
23,800.00	91.00	330.21	11,278.39	8,229.03	-5,343.43	14,420,984.21	1,699,750.82	39.70939309	-80.78902257	
23,900.00	91.00	330.21	11,276.64	8,315.80	-5,393.10	14,421,070.98	1,699,701.15	39.70963172	-80.78919847	



Planning Report - Geographic

Database:	DB_Dec2220_v16	Local Co-ordinate Reference:	Well Jeffersons N-08 HU (slot J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1217.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1217.00ft
Site:	Jeffersons	North Reference:	Grid
Well:	Jeffersons N-08 HU (slot J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
24,000.00	91.00	330.21	11,274.90	8,402.57	-5,442.78	14,421,157.76	1,699,651.48	39.70987034	-80.78937436
24,100.00	91.00	330.21	11,273.15	8,489.35	-5,492.45	14,421,244.53	1,699,601.81	39.71010897	-80.78955026
24,200.00	91.00	330.21	11,271.41	8,576.12	-5,542.12	14,421,331.30	1,699,552.14	39.71034760	-80.78972616
24,223.22	91.00	330.21	11,271.00	8,596.27	-5,553.65	14,421,351.45	1,699,540.60	39.71040300	-80.78976700
PBHL/TD 24223.22 MD 11271.00 TVD - 20" Casing									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Jeffersons N-08HU BHL - hit/miss target - Shape - Point	0.00	0.00	11,271.00	8,596.27	-5,553.65	14,421,351.45	1,699,540.60	39.71040300	-80.78976700
Jeffersons N-08HU LP 5 - plan misses target center by 0.01ft at 12541.85ft MD (11475.00 TVD, -1540.04 N, 248.75 E) - Point	0.00	0.01	11,475.00	-1,540.05	248.75	14,411,215.16	1,705,343.00	39.68252635	-80.76922771
Jeffersons N-08HU LP - plan misses target center by 43.33ft at 12516.85ft MD (11475.00 TVD, -1561.71 N, 261.22 E) - Point	0.00	0.00	11,475.00	-1,540.05	298.75	14,411,215.16	1,705,392.99	39.68252600	-80.76905000

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
24,223.22	11,271.00	20" Casing	20	24	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
3,200.00	3,200.00	0.00	0.00	KOP Begin 2°/100' build	
3,450.00	3,449.68	-10.24	3.75	Begin 5.00° tangent	
7,013.88	7,000.00	-301.93	110.49	Begin 2°/100' build/turn	
8,687.40	8,532.53	-875.69	320.44	Begin 38.47° tangent	
10,587.43	10,004.46	-1,974.05	722.34	Begin 6°/100' build/turn	
12,024.27	11,305.74	-1,942.43	505.40	Begin 8°/100' build/turn	
12,541.84	11,475.00	-1,540.05	248.76	Begin 91.00° lateral	
24,223.22	11,271.00	8,596.27	-5,553.65	PBHL/TD 24223.22 MD 11271.00 TVD	