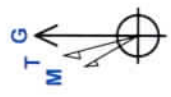




**Well:** Pendleton S-13 HU (slot A)  
**Site:** Pendleton  
**Project:** Marshall County, West Virginia NAD83 UTM 17N  
**Design:** rev6

Geoidetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD83 West Virginia - HARN  
 Ellipsoid: GRS 1980  
 Zone: Zone 17N (64 W to 78 W)  
 System Datum: Mean Sea Level  
 Depth Reference: CL @ 1272.00ft  
 Surface location: Easting Longitude  
 Northing Latitude  
 14437058.533 1716206.748 39.753425000 -80.733696000

Total Corr (M-G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.81°

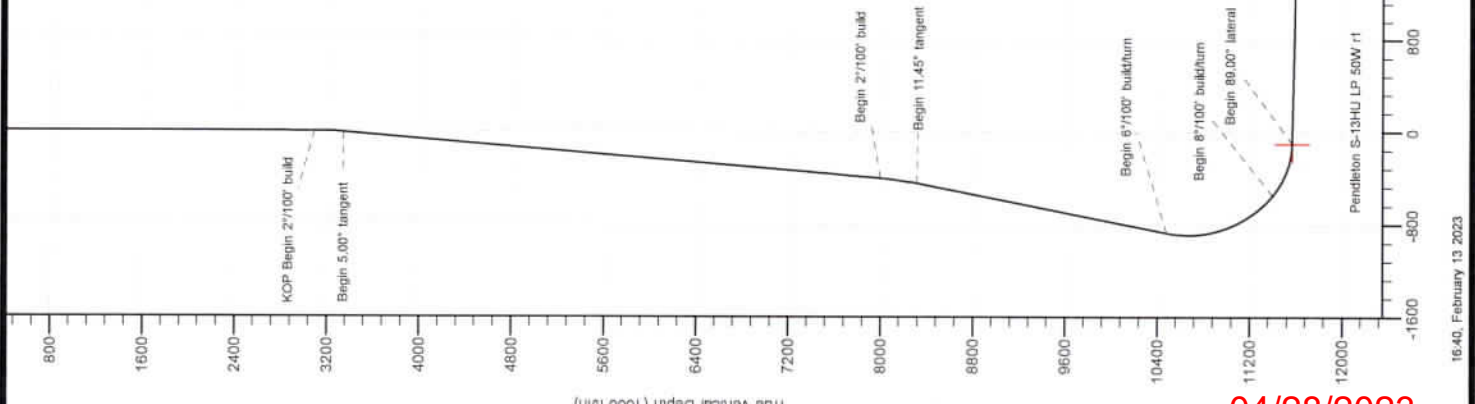
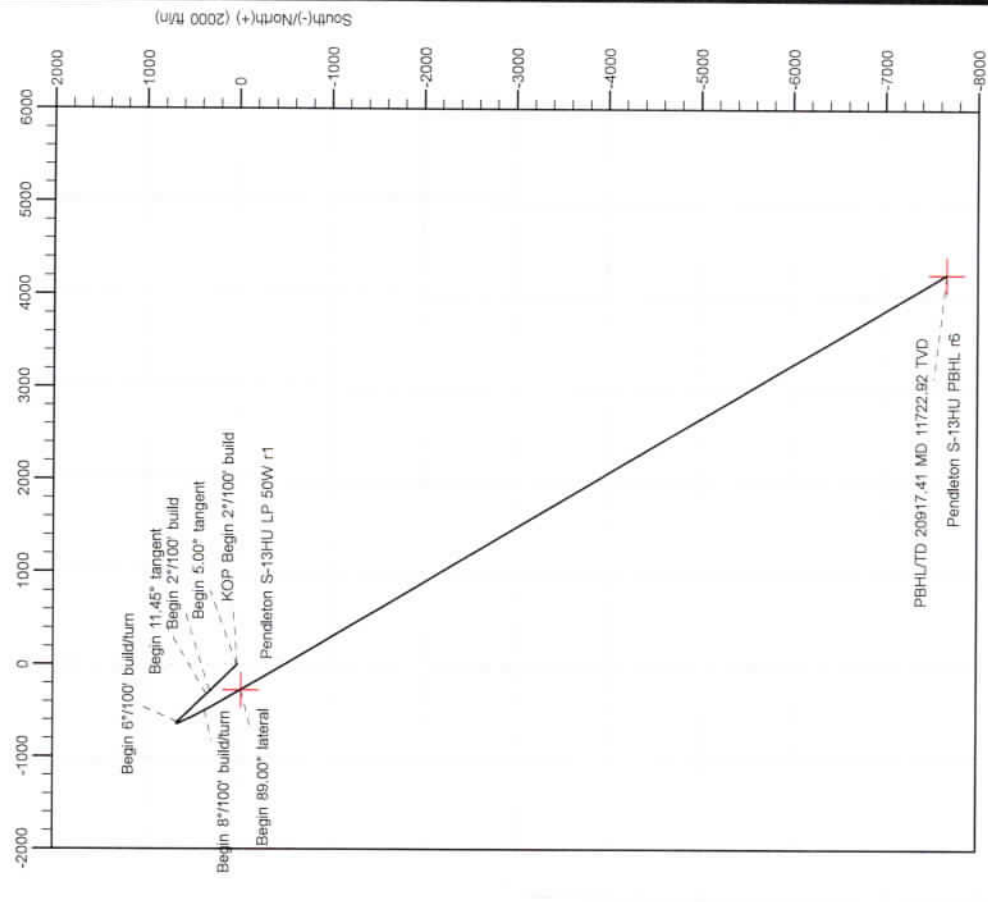


Asimuths to Grid North  
 True North: -0.17°  
 Magnetic North: -8.81°  
 Magnetic Field  
 Strength: 51559.0nT  
 Dip Angle: 66.35°  
 Date: 2/13/2023  
 Model: IGRF2020



**SECTION DETAILS**

Sec	MD	Incl	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V/Sect	Annotation
1	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
2	3100.00	0.00	0.000	3100.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2'100' build
3	3350.00	5.00	315.700	3349.68	7.80	-7.61	2.00	315.70	-10.51	Begin 5.00' tangent
4	8018.08	5.00	315.700	8000.00	298.98	-291.76	0.00	0.00	-402.76	Begin 2'100' build
5	8340.65	11.45	315.386	8319.09	332.26	-323.70	2.00	1.21	-447.33	Begin 11.45' tangent
6	10551.10	11.45	315.386	10465.54	649.98	-626.41	0.00	0.00	-871.79	Begin 8'100' build/hum
7	11569.53	50.00	151.533	11400.33	351.40	-497.78	5.00	-166.78	-548.23	Begin 8'100' build/hum
8	12057.60	89.00	149.413	11568.00	-38.18	-275.86	8.00	-3.37	-89.92	Begin 89.00' lateral
9	20917.41	89.00	149.413	11722.92	-7864.01	4231.78	0.00	0.00	8754.72	PBHL/TD



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04/28/2023



Planning Report - Geographic

<b>Database:</b>	DB_Decv0422v16	<b>Local Co-ordinate Reference:</b>	Well Pendleton S-13 HU (slot A)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1272.00ft
<b>Project:</b>	Marshall County, West Virginia NAD83 UTM 17N	<b>MD Reference:</b>	GL @ 1272.00ft
<b>Site:</b>	Pendleton	<b>North Reference:</b>	Grid
<b>Well:</b>	Pendleton S-13 HU (slot A)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev6		

<b>Project</b>	Marshall County, West Virginia NAD83 UTM 17N		
<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>	Pendleton				
<b>Site Position:</b>		<b>Northing:</b>	14,437,088.243 usft	<b>Latitude:</b>	39.753506850
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,715,175.249 usft	<b>Longitude:</b>	-80.734007760
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "		

<b>Well</b>	Pendleton S-13 HU (slot A)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	14,437,058.533 usft	<b>Latitude:</b>	39.753425000
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	1,715,206.748 usft	<b>Longitude:</b>	-80.733896000
<b>Position Uncertainty</b>	0.00 ft		<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	1,272.00 ft
<b>Grid Convergence:</b>	0.17 "					

<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	2/13/2023	-8.64	66.35	51,559.91083917

<b>Design</b>	rev6			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<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	151.094

<b>Plan Survey Tool Program</b>	<b>Date</b>	2/13/2023		
<b>Depth From (ft)</b>	<b>Depth To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	20,917.41 rev6 (Original Hole)	MWD MWD - Standard	

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Planning Report - Geographic

<b>Database:</b>	DB_Decv0422v16	<b>Local Co-ordinate Reference:</b>	Well Pendleton S-13 HU (slot A)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1272.00ft
<b>Project:</b>	Marshall County, West Virginia NAD83 UTM 17N	<b>MD Reference:</b>	GL @ 1272.00ft
<b>Site:</b>	Pendleton	<b>North Reference:</b>	Grid
<b>Well:</b>	Pendleton S-13 HU (slot A)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev6		

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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	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,100.00	0.00	0.000	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,350.00	5.00	315.700	3,349.68	7.80	-7.61	2.00	2.00	0.00	315.70	
8,018.08	5.00	315.700	8,000.00	298.98	-291.76	0.00	0.00	0.00	0.00	
8,340.65	11.45	316.386	8,319.09	332.26	-323.70	2.00	2.00	0.21	1.21	
10,551.10	11.45	316.386	10,485.54	649.98	-626.41	0.00	0.00	0.00	0.00	
11,569.53	50.00	151.533	11,400.33	351.40	-497.78	6.00	3.79	-16.19	-166.78	
12,057.60	89.00	149.413	11,568.00	-38.18	-275.86	8.00	7.99	-0.43	-3.37	
20,917.41	89.00	149.413	11,722.92	-7,664.01	4,231.78	0.00	0.00	0.00	0.00	Pendleton S-13HU PE





Planning Report - Geographic

Database: DB\_Decv0422v16  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia NAD83 UTM 17N  
 Site: Pendleton  
 Well: Pendleton S-13 HU (slot A)  
 Wellbore: Original Hole  
 Design: rev6

Local Co-ordinate Reference:  
 TVD Reference:  
 MD Reference:  
 North Reference:  
 Survey Calculation Method:

Well Pendleton S-13 HU (slot A)  
 GL @ 1272.00ft  
 GL @ 1272.00ft  
 Grid  
 Minimum Curvature

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 Office of Oil and Gas  
 MAR 15 2023  
 WV Department of Environmental Protection

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	0.000	0.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
100.00	0.00	0.000	100.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
200.00	0.00	0.000	200.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
300.00	0.00	0.000	300.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
400.00	0.00	0.000	400.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
500.00	0.00	0.000	500.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
600.00	0.00	0.000	600.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
700.00	0.00	0.000	700.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
800.00	0.00	0.000	800.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
900.00	0.00	0.000	900.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,000.00	0.00	0.000	1,000.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,100.00	0.00	0.000	1,100.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,200.00	0.00	0.000	1,200.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,300.00	0.00	0.000	1,300.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,400.00	0.00	0.000	1,400.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,500.00	0.00	0.000	1,500.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,600.00	0.00	0.000	1,600.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,700.00	0.00	0.000	1,700.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,800.00	0.00	0.000	1,800.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
1,900.00	0.00	0.000	1,900.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,000.00	0.00	0.000	2,000.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,100.00	0.00	0.000	2,100.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,200.00	0.00	0.000	2,200.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,300.00	0.00	0.000	2,300.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,400.00	0.00	0.000	2,400.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,500.00	0.00	0.000	2,500.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,600.00	0.00	0.000	2,600.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,700.00	0.00	0.000	2,700.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,800.00	0.00	0.000	2,800.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
2,900.00	0.00	0.000	2,900.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
3,000.00	0.00	0.000	3,000.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
3,100.00	0.00	0.000	3,100.00	0.00	0.00	14,437,058.533	1,715,206.748	39.753425000	-80.733896000
<b>KOP Begin 2°/100' build</b>									
3,200.00	2.00	315.700	3,199.98	1.25	-1.22	14,437,059.782	1,715,205.529	39.753428440	-80.733900324
3,300.00	4.00	315.700	3,299.84	4.99	-4.87	14,437,063.527	1,715,201.874	39.753438756	-80.733913289
3,350.00	5.00	315.700	3,349.68	7.80	-7.61	14,437,066.335	1,715,199.134	39.753446489	-80.733923007
<b>Begin 5.00° tangent</b>									
3,400.00	5.00	315.700	3,399.49	10.92	-10.66	14,437,069.454	1,715,196.091	39.753455079	-80.733933803
3,500.00	5.00	315.700	3,499.11	17.16	-16.74	14,437,075.691	1,715,190.004	39.753472259	-80.733955395
3,600.00	5.00	315.700	3,598.73	23.40	-22.83	14,437,081.929	1,715,183.917	39.753489439	-80.733976987
3,700.00	5.00	315.700	3,698.35	29.63	-28.92	14,437,088.167	1,715,177.830	39.753506619	-80.733998578
3,800.00	5.00	315.700	3,797.97	35.87	-35.01	14,437,094.404	1,715,171.743	39.753523799	-80.734020170
3,900.00	5.00	315.700	3,897.59	42.11	-41.09	14,437,100.642	1,715,165.655	39.753540979	-80.734041762
4,000.00	5.00	315.700	3,997.21	48.35	-47.18	14,437,106.880	1,715,159.568	39.753558159	-80.734063354
4,100.00	5.00	315.700	4,096.83	54.58	-53.27	14,437,113.117	1,715,153.481	39.753575339	-80.734084946
4,200.00	5.00	315.700	4,196.45	60.82	-59.35	14,437,119.355	1,715,147.394	39.753592519	-80.734106538
4,300.00	5.00	315.700	4,296.07	67.06	-65.44	14,437,125.593	1,715,141.307	39.753609699	-80.734128130
4,400.00	5.00	315.700	4,395.69	73.30	-71.53	14,437,131.830	1,715,135.220	39.753626879	-80.734149721
4,500.00	5.00	315.700	4,495.31	79.54	-77.62	14,437,138.068	1,715,129.133	39.753644059	-80.734171313
4,600.00	5.00	315.700	4,594.93	85.77	-83.70	14,437,144.306	1,715,123.046	39.753661239	-80.734192905
4,700.00	5.00	315.700	4,694.55	92.01	-89.79	14,437,150.543	1,715,116.959	39.753678419	-80.734214497
4,800.00	5.00	315.700	4,794.17	98.25	-95.88	14,437,156.781	1,715,110.872	39.753695599	-80.734236089
4,900.00	5.00	315.700	4,893.78	104.49	-101.96	14,437,163.019	1,715,104.785	39.753712779	-80.734257681





Planning Report - Geographic

Database: DB\_Decv0422v16  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia NAD83 UTM 17N  
 Site: Pendleton  
 Well: Pendleton S-13 HU (slot A)  
 Wellbore: Original Hole  
 Design: rev6

Local Co-ordinate Reference:  
 TVD Reference:  
 MD Reference:  
 North Reference:  
 Survey Calculation Method:

Well Pendleton S-13 HU (slot A) RECEIVED  
 GL @ 1272.00ft  
 GL @ 1272.00ft  
 Office of Oil and Gas

Grid  
 Minimum Curvature

MAR 15 2023  
 WV Department of Environmental Protection

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,000.00	5.00	315.700	4,993.40	110.72	-108.05	14,437,169.256	1,715,098.698	39.753729959	-80.734279273
5,100.00	5.00	315.700	5,093.02	116.96	-114.14	14,437,175.494	1,715,092.611	39.753747139	-80.734300865
5,200.00	5.00	315.700	5,192.64	123.20	-120.22	14,437,181.732	1,715,086.523	39.753764319	-80.734322457
5,300.00	5.00	315.700	5,292.26	129.44	-126.31	14,437,187.969	1,715,080.436	39.753781498	-80.734344049
5,400.00	5.00	315.700	5,391.88	135.67	-132.40	14,437,194.207	1,715,074.349	39.753798678	-80.734365641
5,500.00	5.00	315.700	5,491.50	141.91	-138.49	14,437,200.445	1,715,068.262	39.753815858	-80.734387233
5,600.00	5.00	315.700	5,591.12	148.15	-144.57	14,437,206.682	1,715,062.175	39.753833038	-80.734408825
5,700.00	5.00	315.700	5,690.74	154.39	-150.66	14,437,212.920	1,715,056.088	39.753850218	-80.734430417
5,800.00	5.00	315.700	5,790.36	160.63	-156.75	14,437,219.158	1,715,050.001	39.753867398	-80.734452009
5,900.00	5.00	315.700	5,889.98	166.86	-162.83	14,437,225.395	1,715,043.914	39.753884578	-80.734473601
6,000.00	5.00	315.700	5,989.60	173.10	-168.92	14,437,231.633	1,715,037.827	39.753901758	-80.734495193
6,100.00	5.00	315.700	6,089.22	179.34	-175.01	14,437,237.871	1,715,031.740	39.753918938	-80.734516785
6,200.00	5.00	315.700	6,188.84	185.58	-181.10	14,437,244.108	1,715,025.653	39.753936118	-80.734538377
6,300.00	5.00	315.700	6,288.46	191.81	-187.18	14,437,250.346	1,715,019.566	39.753953298	-80.734559969
6,400.00	5.00	315.700	6,388.08	198.05	-193.27	14,437,256.584	1,715,013.479	39.753970477	-80.734581561
6,500.00	5.00	315.700	6,487.70	204.29	-199.36	14,437,262.821	1,715,007.391	39.753987657	-80.734603153
6,600.00	5.00	315.700	6,587.32	210.53	-205.44	14,437,269.059	1,715,001.304	39.754004837	-80.734624746
6,700.00	5.00	315.700	6,686.94	216.76	-211.53	14,437,275.297	1,714,995.217	39.754022017	-80.734646338
6,800.00	5.00	315.700	6,786.55	223.00	-217.62	14,437,281.534	1,714,989.130	39.754039197	-80.734667930
6,900.00	5.00	315.700	6,886.17	229.24	-223.71	14,437,287.772	1,714,983.043	39.754056377	-80.734689522
7,000.00	5.00	315.700	6,985.79	235.48	-229.79	14,437,294.010	1,714,976.956	39.754073557	-80.734711114
7,100.00	5.00	315.700	7,085.41	241.71	-235.88	14,437,300.247	1,714,970.869	39.754090737	-80.734732706
7,200.00	5.00	315.700	7,185.03	247.95	-241.97	14,437,306.485	1,714,964.782	39.754107916	-80.734754298
7,300.00	5.00	315.700	7,284.65	254.19	-248.05	14,437,312.723	1,714,958.695	39.754125096	-80.734775891
7,400.00	5.00	315.700	7,384.27	260.43	-254.14	14,437,318.960	1,714,952.608	39.754142276	-80.734797483
7,500.00	5.00	315.700	7,483.89	266.67	-260.23	14,437,325.198	1,714,946.521	39.754159456	-80.734819075
7,600.00	5.00	315.700	7,583.51	272.90	-266.32	14,437,331.435	1,714,940.434	39.754176636	-80.734840667
7,700.00	5.00	315.700	7,683.13	279.14	-272.40	14,437,337.673	1,714,934.347	39.754193816	-80.734862260
7,800.00	5.00	315.700	7,782.75	285.38	-278.49	14,437,343.911	1,714,928.259	39.754210996	-80.734883852
7,900.00	5.00	315.700	7,882.37	291.62	-284.58	14,437,350.148	1,714,922.172	39.754228175	-80.734905444
8,000.00	5.00	315.700	7,981.99	297.85	-290.66	14,437,356.386	1,714,916.085	39.754245355	-80.734927036
8,018.08	5.00	315.700	8,000.00	298.98	-291.76	14,437,357.514	1,714,914.985	39.754248461	-80.734930940
<b>Begin 2°/100' build</b>									
8,100.00	6.64	316.000	8,081.49	304.94	-297.55	14,437,363.475	1,714,909.202	39.754264880	-80.734951453
8,200.00	8.64	316.212	8,180.60	314.52	-306.76	14,437,373.055	1,714,899.989	39.754291263	-80.734984130
8,300.00	10.64	316.345	8,279.19	326.62	-318.33	14,437,385.155	1,714,888.420	39.754324588	-80.735025166
8,340.65	11.45	316.386	8,319.09	332.26	-323.70	14,437,390.792	1,714,883.046	39.754340112	-80.735044228
<b>Begin 11.45° tangent</b>									
8,400.00	11.45	316.386	8,377.25	340.79	-331.83	14,437,399.322	1,714,874.919	39.754363604	-80.735073054
8,500.00	11.45	316.386	8,475.26	355.16	-345.52	14,437,413.695	1,714,861.225	39.754403188	-80.735121628
8,600.00	11.45	316.386	8,573.27	369.54	-359.22	14,437,428.069	1,714,847.531	39.754442773	-80.735170201
8,700.00	11.45	316.386	8,671.28	383.91	-372.91	14,437,442.442	1,714,833.836	39.754482357	-80.735218775
8,800.00	11.45	316.386	8,769.29	398.28	-386.61	14,437,456.816	1,714,820.142	39.754521942	-80.735267349
8,900.00	11.45	316.386	8,867.30	412.66	-400.30	14,437,471.189	1,714,806.448	39.754561526	-80.735315922
9,000.00	11.45	316.386	8,965.31	427.03	-414.00	14,437,485.562	1,714,792.753	39.754601110	-80.735364496
9,100.00	11.45	316.386	9,063.32	441.40	-427.69	14,437,499.936	1,714,779.059	39.754640695	-80.735413070
9,200.00	11.45	316.386	9,161.33	455.78	-441.38	14,437,514.309	1,714,765.365	39.754680279	-80.735461644
9,300.00	11.45	316.386	9,259.34	470.15	-455.08	14,437,528.682	1,714,751.670	39.754719864	-80.735510218
9,400.00	11.45	316.386	9,357.35	484.52	-468.77	14,437,543.056	1,714,737.976	39.754759448	-80.735558792
9,500.00	11.45	316.386	9,455.36	498.90	-482.47	14,437,557.429	1,714,724.282	39.754799032	-80.735607366
9,600.00	11.45	316.386	9,553.37	513.27	-496.16	14,437,571.803	1,714,710.588	39.754838617	-80.735655940
9,700.00	11.45	316.386	9,651.38	527.64	-509.86	14,437,586.176	1,714,696.893	39.754878201	-80.735704514
9,800.00	11.45	316.386	9,749.39	542.02	-523.55	14,437,600.549	1,714,683.199	39.754917785	-80.735753088





Planning Report - Geographic

Database: DB\_Decv0422v16  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia NAD83 UTM 17N  
 Site: Pendleton  
 Well: Pendleton S-13 HU (slot A)  
 Wellbore: Original Hole  
 Design: rev6

Local Co-ordinate Reference: Well Pendleton S-13 HU (slot A)  
 TVD Reference: GL @ 1272.00ft  
 MD Reference: GL @ 1272.00ft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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 MAR 15 2023  
 WV Department of Environmental Protection

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,900.00	11.45	316.386	9,847.39	556.39	-537.24	14,437,614.923	1,714,669.505	39.754957369	-80.735801662
10,000.00	11.45	316.386	9,945.40	570.76	-550.94	14,437,629.296	1,714,655.810	39.754996954	-80.735850237
10,100.00	11.45	316.386	10,043.41	585.14	-564.63	14,437,643.669	1,714,642.116	39.755036538	-80.735898811
10,200.00	11.45	316.386	10,141.42	599.51	-578.33	14,437,658.043	1,714,628.422	39.755076122	-80.735947385
10,300.00	11.45	316.386	10,239.43	613.88	-592.02	14,437,672.416	1,714,614.727	39.755115706	-80.735995960
10,400.00	11.45	316.386	10,337.44	628.26	-605.72	14,437,686.790	1,714,601.033	39.755155290	-80.736044534
10,500.00	11.45	316.386	10,435.45	642.63	-619.41	14,437,701.163	1,714,587.339	39.755194875	-80.736093109
10,551.10	11.45	316.386	10,485.54	649.98	-626.41	14,437,708.508	1,714,580.340	39.755215104	-80.736117933
<b>Begin 6°/100' build/turn</b>									
10,600.00	8.62	311.909	10,533.68	655.94	-632.49	14,437,714.471	1,714,574.264	39.755231529	-80.736139491
10,650.00	5.83	302.936	10,583.28	659.82	-637.41	14,437,718.356	1,714,569.342	39.755242238	-80.736156962
10,700.00	3.42	279.867	10,633.12	661.46	-641.01	14,437,719.994	1,714,565.740	39.755246763	-80.736169763
10,750.00	2.72	222.682	10,683.06	660.85	-643.28	14,437,719.378	1,714,563.467	39.755245092	-80.736177856
10,800.00	4.59	183.847	10,732.96	657.98	-644.22	14,437,716.512	1,714,562.530	39.755237229	-80.736181221
10,850.00	7.26	170.248	10,782.69	652.87	-643.82	14,437,711.404	1,714,562.931	39.755223196	-80.736179848
10,900.00	10.12	164.103	10,832.11	645.53	-642.08	14,437,704.066	1,714,564.669	39.755203031	-80.736173740
10,950.00	13.04	160.665	10,881.09	635.99	-639.01	14,437,694.520	1,714,567.739	39.755176790	-80.736162915
11,000.00	15.99	158.474	10,929.49	624.26	-634.62	14,437,682.792	1,714,572.134	39.755144544	-80.736147403
11,050.00	18.95	156.952	10,977.18	610.38	-628.91	14,437,668.912	1,714,577.840	39.755106382	-80.736127244
11,100.00	21.93	155.829	11,024.03	594.39	-621.91	14,437,652.921	1,714,584.843	39.755062409	-80.736102496
11,150.00	24.91	154.964	11,069.91	576.33	-613.63	14,437,634.861	1,714,593.122	39.755012744	-80.736073226
11,200.00	27.89	154.273	11,114.69	556.25	-604.09	14,437,614.782	1,714,602.656	39.754957525	-80.736039513
11,250.00	30.88	153.706	11,158.25	534.21	-593.33	14,437,592.739	1,714,613.419	39.754896902	-80.736001451
11,300.00	33.87	153.230	11,200.48	510.26	-581.37	14,437,568.793	1,714,625.380	39.754831042	-80.735959144
11,350.00	36.86	152.823	11,241.25	484.48	-568.24	14,437,543.009	1,714,638.507	39.754760124	-80.735912708
11,400.00	39.85	152.469	11,280.45	456.93	-553.99	14,437,515.457	1,714,652.764	39.754684345	-80.735862270
11,450.00	42.84	152.156	11,317.98	427.68	-538.64	14,437,486.214	1,714,668.112	39.754603910	-80.735807968
11,500.00	45.84	151.877	11,353.74	396.83	-522.24	14,437,455.359	1,714,684.509	39.754519041	-80.735749951
11,550.00	48.83	151.625	11,387.62	364.44	-504.84	14,437,422.977	1,714,701.909	39.754429970	-80.735688379
11,569.53	50.00	151.533	11,400.33	351.40	-497.78	14,437,409.932	1,714,708.969	39.754394088	-80.735663397
<b>Begin 8°/100' build/turn</b>									
11,600.00	52.43	151.352	11,419.41	330.54	-486.43	14,437,389.073	1,714,720.323	39.754336710	-80.735623220
11,650.00	56.43	151.080	11,448.49	294.90	-466.85	14,437,353.436	1,714,739.904	39.754238683	-80.735553925
11,700.00	60.42	150.832	11,474.67	257.67	-446.17	14,437,316.204	1,714,760.581	39.754136265	-80.735480744
11,750.00	64.42	150.603	11,497.81	219.03	-424.49	14,437,277.557	1,714,782.255	39.754029956	-80.735404036
11,800.00	68.41	150.388	11,517.82	179.15	-401.93	14,437,237.686	1,714,804.819	39.753920274	-80.735324172
11,850.00	72.41	150.186	11,534.58	138.25	-378.59	14,437,196.782	1,714,828.163	39.753807752	-80.735241544
11,900.00	76.40	149.992	11,548.02	96.51	-354.57	14,437,155.047	1,714,852.174	39.753692940	-80.735156552
11,950.00	80.40	149.804	11,558.07	54.15	-330.01	14,437,112.683	1,714,876.734	39.753576397	-80.735069611
12,000.00	84.39	149.621	11,564.68	11.36	-305.02	14,437,069.896	1,714,901.725	39.753458690	-80.734981146
12,050.00	88.39	149.440	11,567.83	-31.64	-279.72	14,437,026.896	1,714,927.024	39.753340393	-80.734891586
12,057.60	89.00	149.413	11,568.00	-38.18	-275.86	14,437,020.350	1,714,930.891	39.753322386	-80.734877897
<b>Begin 89.00° lateral</b>									
12,100.00	89.00	149.413	11,568.74	-74.67	-254.29	14,436,983.859	1,714,952.460	39.753221996	-80.734801536
12,200.00	89.00	149.413	11,570.49	-160.75	-203.41	14,436,897.787	1,715,003.338	39.752985204	-80.734621424
12,300.00	89.00	149.413	11,572.24	-246.82	-152.53	14,436,811.715	1,715,054.215	39.752748412	-80.734441312
12,400.00	89.00	149.413	11,573.99	-332.89	-101.66	14,436,725.643	1,715,105.092	39.752511620	-80.734261202
12,500.00	89.00	149.413	11,575.74	-418.96	-50.78	14,436,639.571	1,715,155.970	39.752274827	-80.734081093
12,600.00	89.00	149.413	11,577.48	-505.03	0.10	14,436,553.499	1,715,206.847	39.752038034	-80.733900985
12,700.00	89.00	149.413	11,579.23	-591.11	50.98	14,436,467.427	1,715,257.724	39.751801241	-80.733720879
12,800.00	89.00	149.413	11,580.98	-677.18	101.85	14,436,381.355	1,715,308.601	39.751564447	-80.733540774
12,900.00	89.00	149.413	11,582.73	-763.25	152.73	14,436,295.283	1,715,359.479	39.751327654	-80.733360670
13,000.00	89.00	149.413	11,584.48	-849.32	203.61	14,436,209.211	1,715,410.356	39.751090859	-80.733180567





Planning Report - Geographic

**Database:** DB\_Decv0422v16  
**Company:** Tug Hill Operating LLC  
**Project:** Marshall County, West Virginia NAD83 UTM 17N  
**Site:** Pendleton  
**Well:** Pendleton S-13 HU (slot A)  
**Wellbore:** Original Hole  
**Design:** rev6

**Local Co-ordinate Reference:**  
**TVD Reference:**  
**MD Reference:**

Well Pendleton S-13 HU (slot A)  
 GL @ 1272.00ft  
 GL @ 1272.00ft

**North Reference:**  
**Survey Calculation Method:**

Grid  
 Minimum Curvature

**RECEIVED**  
 Office of Oil and Gas  
**MAR 15 2023**

WV Department of  
 Environmental Protection

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,100.00	89.00	149.413	11,586.23	-935.40	254.49	14,436,123.139	1,715,461.233	39.750854065	-80.733000465
13,200.00	89.00	149.413	11,587.98	-1,021.47	305.36	14,436,037.066	1,715,512.111	39.750617270	-80.732820365
13,300.00	89.00	149.413	11,589.72	-1,107.54	356.24	14,435,950.994	1,715,562.988	39.750380475	-80.732640266
13,400.00	89.00	149.413	11,591.47	-1,193.61	407.12	14,435,864.922	1,715,613.865	39.750143680	-80.732460168
13,500.00	89.00	149.413	11,593.22	-1,279.69	458.00	14,435,778.850	1,715,664.743	39.749906884	-80.732280072
13,600.00	89.00	149.413	11,594.97	-1,365.76	508.87	14,435,692.778	1,715,715.620	39.748670089	-80.732099976
13,700.00	89.00	149.413	11,596.72	-1,451.83	559.75	14,435,606.706	1,715,766.497	39.749433292	-80.731919882
13,800.00	89.00	149.413	11,598.47	-1,537.90	610.63	14,435,520.634	1,715,817.374	39.749196496	-80.731739789
13,900.00	89.00	149.413	11,600.22	-1,623.97	661.51	14,435,434.562	1,715,868.252	39.748959699	-80.731559697
14,000.00	89.00	149.413	11,601.96	-1,710.05	712.38	14,435,348.490	1,715,919.130	39.748722902	-80.731379607
14,100.00	89.00	149.413	11,603.71	-1,796.12	763.26	14,435,262.418	1,715,970.007	39.748486105	-80.731199518
14,200.00	89.00	149.413	11,605.46	-1,882.19	814.14	14,435,176.346	1,716,020.885	39.748249308	-80.731019430
14,300.00	89.00	149.413	11,607.21	-1,968.26	865.01	14,435,090.274	1,716,071.762	39.748012510	-80.730839343
14,400.00	89.00	149.413	11,608.96	-2,054.34	915.89	14,435,004.202	1,716,122.639	39.747775712	-80.730659257
14,500.00	89.00	149.413	11,610.71	-2,140.41	966.77	14,434,918.130	1,716,173.517	39.747538913	-80.730479173
14,600.00	89.00	149.413	11,612.46	-2,226.48	1,017.65	14,434,832.057	1,716,224.394	39.747302115	-80.730299090
14,700.00	89.00	149.413	11,614.20	-2,312.55	1,068.52	14,434,745.985	1,716,275.271	39.747065316	-80.730119008
14,800.00	89.00	149.413	11,615.95	-2,398.62	1,119.40	14,434,659.913	1,716,326.148	39.746828516	-80.729938927
14,900.00	89.00	149.413	11,617.70	-2,484.70	1,170.28	14,434,573.841	1,716,377.026	39.746591717	-80.729758848
15,000.00	89.00	149.413	11,619.45	-2,570.77	1,221.16	14,434,487.769	1,716,427.903	39.746354917	-80.729578770
15,100.00	89.00	149.413	11,621.20	-2,656.84	1,272.03	14,434,401.697	1,716,478.780	39.746118117	-80.729398693
15,200.00	89.00	149.413	11,622.95	-2,742.91	1,322.91	14,434,315.625	1,716,529.658	39.745881316	-80.729218617
15,300.00	89.00	149.413	11,624.70	-2,828.99	1,373.79	14,434,229.553	1,716,580.535	39.745644516	-80.729038543
15,400.00	89.00	149.413	11,626.44	-2,915.06	1,424.67	14,434,143.481	1,716,631.412	39.745407715	-80.728858469
15,500.00	89.00	149.413	11,628.19	-3,001.13	1,475.54	14,434,057.409	1,716,682.289	39.745170914	-80.728678397
15,600.00	89.00	149.413	11,629.94	-3,087.20	1,526.42	14,433,971.337	1,716,733.167	39.744934112	-80.728498327
15,700.00	89.00	149.413	11,631.69	-3,173.27	1,577.30	14,433,885.265	1,716,784.044	39.744697310	-80.728318257
15,800.00	89.00	149.413	11,633.44	-3,259.35	1,628.18	14,433,799.193	1,716,834.921	39.744460508	-80.728138189
15,900.00	89.00	149.413	11,635.19	-3,345.42	1,679.05	14,433,713.120	1,716,885.799	39.744223706	-80.727958122
16,000.00	89.00	149.413	11,636.94	-3,431.49	1,729.93	14,433,627.048	1,716,936.676	39.743986903	-80.727778056
16,100.00	89.00	149.413	11,638.68	-3,517.56	1,780.81	14,433,540.976	1,716,987.553	39.743750100	-80.727597991
16,200.00	89.00	149.413	11,640.43	-3,603.64	1,831.69	14,433,454.904	1,717,038.431	39.743513297	-80.727417928
16,300.00	89.00	149.413	11,642.18	-3,689.71	1,882.56	14,433,368.832	1,717,089.308	39.743276493	-80.727237865
16,400.00	89.00	149.413	11,643.93	-3,775.78	1,933.44	14,433,282.760	1,717,140.185	39.743039689	-80.727057804
16,500.00	89.00	149.413	11,645.68	-3,861.85	1,984.32	14,433,196.688	1,717,191.062	39.742802885	-80.726877745
16,600.00	89.00	149.413	11,647.43	-3,947.93	2,035.19	14,433,110.616	1,717,241.940	39.742566081	-80.726697686
16,700.00	89.00	149.413	11,649.18	-4,034.00	2,086.07	14,433,024.544	1,717,292.817	39.742329276	-80.726517629
16,800.00	89.00	149.413	11,650.92	-4,120.07	2,136.95	14,432,938.472	1,717,343.694	39.742092471	-80.726337573
16,900.00	89.00	149.413	11,652.67	-4,206.14	2,187.83	14,432,852.400	1,717,394.572	39.741855666	-80.726157518
17,000.00	89.00	149.413	11,654.42	-4,292.21	2,238.70	14,432,766.328	1,717,445.449	39.741618861	-80.725977465
17,100.00	89.00	149.413	11,656.17	-4,378.29	2,289.58	14,432,680.256	1,717,496.326	39.741382055	-80.725797412
17,200.00	89.00	149.413	11,657.92	-4,464.36	2,340.46	14,432,594.183	1,717,547.204	39.741145249	-80.725617361
17,300.00	89.00	149.413	11,659.67	-4,550.43	2,391.34	14,432,508.111	1,717,598.081	39.740908442	-80.725437311
17,400.00	89.00	149.413	11,661.42	-4,636.50	2,442.21	14,432,422.039	1,717,648.958	39.740671636	-80.725257263
17,500.00	89.00	149.413	11,663.16	-4,722.58	2,493.09	14,432,335.966	1,717,699.835	39.740434829	-80.725077215
17,600.00	89.00	149.413	11,664.91	-4,808.65	2,543.97	14,432,249.894	1,717,750.713	39.740198021	-80.724897169
17,700.00	89.00	149.413	11,666.66	-4,894.72	2,594.85	14,432,163.822	1,717,801.590	39.740114524	-80.724717124
17,800.00	89.00	149.413	11,668.41	-4,980.79	2,645.72	14,432,077.750	1,717,852.467	39.739724406	-80.724537080
17,900.00	89.00	149.413	11,670.16	-5,066.86	2,696.60	14,431,991.678	1,717,903.345	39.739487598	-80.724357038
18,000.00	89.00	149.413	11,671.91	-5,152.94	2,747.48	14,431,905.606	1,717,954.222	39.739250790	-80.724176996
18,100.00	89.00	149.413	11,673.66	-5,239.01	2,798.36	14,431,819.534	1,718,005.099	39.739013981	-80.723996956
18,200.00	89.00	149.413	11,675.40	-5,325.08	2,849.23	14,431,733.462	1,718,055.976	39.738777172	-80.723816918
18,300.00	89.00	149.413	11,677.15	-5,411.15	2,900.11	14,431,647.390	1,718,106.854	39.738540363	-80.723636880
18,400.00	89.00	149.413	11,678.90	-5,497.23	2,950.99	14,431,561.318	1,718,157.731	39.738303553	-80.723456844



Planning Report - Geographic

<b>Database:</b>	DB_Decv0422v16	<b>Local Co-ordinate Reference:</b>	Well Pendleton S-13 HU (slot A)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1272.00ft
<b>Project:</b>	Marshall County, West Virginia NAD83 UTM 17N	<b>MD Reference:</b>	GL @ 1272.00ft
<b>Site:</b>	Pendleton	<b>North Reference:</b>	Grid
<b>Well:</b>	Pendleton S-13 HU (slot A)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev6		

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	89.00	149.413	11,680.65	-5,583.30	3,001.87	14,431,475.245	1,718,208.608	39.738066743	-80.723276808
18,600.00	89.00	149.413	11,682.40	-5,669.37	3,052.74	14,431,389.173	1,718,259.486	39.737829933	-80.723096775
18,700.00	89.00	149.413	11,684.15	-5,755.44	3,103.62	14,431,303.101	1,718,310.363	39.737593123	-80.722916742
18,800.00	89.00	149.413	11,685.90	-5,841.51	3,154.50	14,431,217.029	1,718,361.240	39.737356312	-80.722736710
18,900.00	89.00	149.413	11,687.64	-5,927.59	3,205.38	14,431,130.957	1,718,412.118	39.737119501	-80.722556680
19,000.00	89.00	149.413	11,689.39	-6,013.66	3,256.25	14,431,044.885	1,718,462.995	39.736882690	-80.722376651
19,100.00	89.00	149.413	11,691.14	-6,099.73	3,307.13	14,430,958.813	1,718,513.872	39.736645879	-80.722196623
19,200.00	89.00	149.413	11,692.89	-6,185.80	3,358.01	14,430,872.741	1,718,564.749	39.736409067	-80.722016597
19,300.00	89.00	149.413	11,694.64	-6,271.88	3,408.88	14,430,786.669	1,718,615.627	39.736172255	-80.721836572
19,400.00	89.00	149.413	11,696.39	-6,357.95	3,459.76	14,430,700.597	1,718,666.504	39.735935443	-80.721656547
19,500.00	89.00	149.413	11,698.14	-6,444.02	3,510.64	14,430,614.525	1,718,717.381	39.735698630	-80.721476525
19,600.00	89.00	149.413	11,699.88	-6,530.09	3,561.52	14,430,528.453	1,718,768.259	39.735461817	-80.721296503
19,700.00	89.00	149.413	11,701.63	-6,616.17	3,612.39	14,430,442.381	1,718,819.136	39.735225004	-80.721116483
19,800.00	89.00	149.413	11,703.38	-6,702.24	3,663.27	14,430,356.308	1,718,870.013	39.734988190	-80.720936463
19,900.00	89.00	149.413	11,705.13	-6,788.31	3,714.15	14,430,270.236	1,718,920.891	39.734751376	-80.720756446
20,000.00	89.00	149.413	11,706.88	-6,874.38	3,765.03	14,430,184.164	1,718,971.768	39.734514562	-80.720576429
20,100.00	89.00	149.413	11,708.63	-6,960.45	3,815.90	14,430,098.092	1,719,022.645	39.734277748	-80.720396413
20,200.00	89.00	149.413	11,710.38	-7,046.53	3,866.78	14,430,012.020	1,719,073.522	39.734040933	-80.720216399
20,300.00	89.00	149.413	11,712.12	-7,132.60	3,917.66	14,429,925.948	1,719,124.400	39.733804119	-80.720036386
20,400.00	89.00	149.413	11,713.87	-7,218.67	3,968.54	14,429,839.876	1,719,175.277	39.733567303	-80.719856374
20,500.00	89.00	149.413	11,715.62	-7,304.74	4,019.41	14,429,753.804	1,719,226.154	39.733330488	-80.719676364
20,600.00	89.00	149.413	11,717.37	-7,390.82	4,070.29	14,429,667.732	1,719,277.032	39.733093672	-80.719496354
20,700.00	89.00	149.413	11,719.12	-7,476.89	4,121.17	14,429,581.660	1,719,327.909	39.732856856	-80.719316346
20,800.00	89.00	149.413	11,720.87	-7,562.96	4,172.05	14,429,495.588	1,719,378.786	39.732620040	-80.719136339
20,900.00	89.00	149.413	11,722.62	-7,649.03	4,222.92	14,429,409.516	1,719,429.663	39.732383223	-80.718956334
20,917.41	89.00	149.413	11,722.92	-7,664.01	4,231.78	14,429,394.533	1,719,438.520	39.732342000	-80.718925000

PBHL/TD 20917.41 MD 11722.92 TVD

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Pendleton S-13HU LP 5i - plan hits target center - Point	0.00	0.000	11,568.00	-38.18	-275.86	14,437,020.358	1,714,930.889	39.753322407	-80.734877904
Pendleton S-13HU PBH - plan hits target center - Point	0.00	0.000	11,722.92	-7,664.01	4,231.78	14,429,394.533	1,719,438.520	39.732342000	-80.718925000

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Planning Report - Geographic

<b>Database:</b>	DB_Decv0422v16	<b>Local Co-ordinate Reference:</b>	Well Pendleton S-13 HU (slot A)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1272.00ft
<b>Project:</b>	Marshall County, West Virginia NAD83 UTM 17N	<b>MD Reference:</b>	GL @ 1272.00ft
<b>Site:</b>	Pendleton	<b>North Reference:</b>	Grid
<b>Well:</b>	Pendleton S-13 HU (slot A)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev6		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,100.00	3,100.00	0.00	0.00	KOP Begin 2°/100' build
3,350.00	3,349.68	7.80	-7.61	Begin 5.00° tangent
8,018.08	8,000.00	298.98	-291.76	Begin 2°/100' build
8,340.65	8,319.09	332.26	-323.70	Begin 11.45° tangent
10,551.10	10,485.54	649.98	-626.41	Begin 6°/100' build/turn
11,569.53	11,400.33	351.40	-497.78	Begin 8°/100' build/turn
12,057.60	11,568.00	-38.18	-275.86	Begin 89.00° lateral
20,917.41	11,722.92	-7,664.01	4,231.78	PBHL/TD 20917.41 MD 11722.92 TVD

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