



Tug Hill Operating, LLC Casing and Cement Program

Van Winkle N-6HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	515'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,227'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	22,349'	CTS

Cement

Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19

Kick Off Plug: Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug

Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

RECEIVED
Office Of Oil and Gas

MAR 30 2023

WV Department of
Environmental Protection

04/14/2023



Well: Van Winkle N-06 HM (slot U)
 Site: Van Winkle
 Project: Marshall County, West Virginia NAD83 UTM 17N
 Design: rev4
 Rig:

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/AW	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
2	1312.00	0.00	0.000	1312.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1487.00	3.50	135.000	1486.89	-3.78	2.00	135.000	-5.16	0.00	Begin 3.50° tangent
4	2487.00	3.50	135.000	2485.03	-46.95	46.95	0.00	-64.06	0.00	Begin 2°/100' drop
5	2662.00	0.00	135.000	2659.92	-50.72	50.72	2.00	180.000	0.00	Begin vertical hold
6	4014.08	0.00	135.000	4012.00	-50.72	50.72	2.00	180.000	0.00	Begin 2°/100' build
7	4755.85	14.84	150.362	4745.51	-133.74	97.92	2.00	150.38	-164.71	Begin 14.84° tangent
8	5349.14	14.84	150.362	5319.02	-265.80	173.00	0.00	0.00	-316.61	Begin 8°/100' build/turn
9	6159.58	50.00	330.136	6051.03	-64.89	57.06	8.00	178.79	-84.85	Begin 10°/100' build/turn
10	6559.57	91.00	330.178	6184.99	-263.23	-131.16	10.00	0.06	293.62	Begin 91.00° lateral
11	22356.32	91.00	330.178	5909.79	13957.35	-7980.83	0.00	0.00	16077.97	PBHL/TD 22356.32 MD 5909.79 TVD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/AW	Northing	Easting	Latitude	Longitude
Van Winkle N-06HM PBHL r4	5909.79	13957.35	-7980.83	1709349.087	39.820310000	-80.754500000	
- plan hits target center	6185.00	263.23	-131.16	14447702.584	1717199.736	39.782640000	-80.726693000
Van Winkle N-06HM LP r4							
- plan misses target center by 0.01ft at 6569.56ft MD (6184.99 TVD, 263.23 N, -131.16 E)							

Geoid 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=753+12 @ 765.00ft

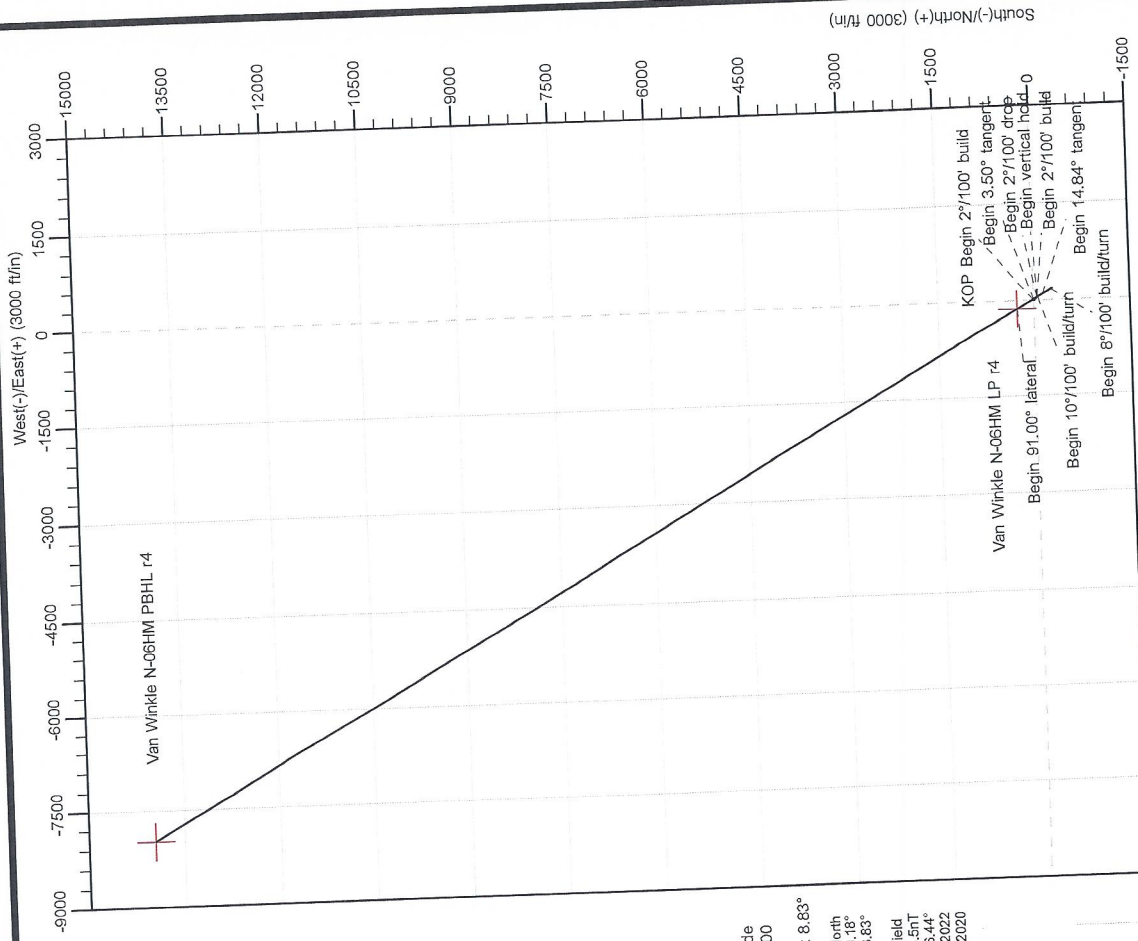
Northing	Easting	Latitude	Longitude
14447439.354	1717329.897	39.781916000	-80.726229000

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.83°

Azimuths to Grid North
 True North: -0.18°
 Magnetic North: -8.83°

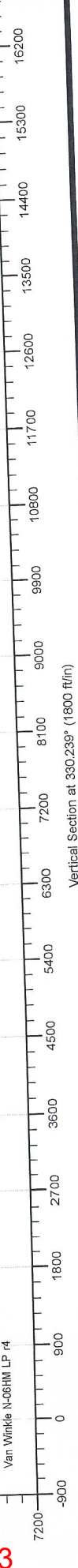


Magnetic Field
 Strength: 51648.5nT
 Dip Angle: 66.44°
 Date: 6/10/2022
 Model: IGRF2020



RECEIVED
 Office Of Oil and Gas
 MAR 30 2023
 WV Department of
 Environmental Protection

04/14/2023



Vertical Section at 330.238° (1800 ft/m)



Planning Report - Geographic

Database:	DB_Feb2822	Local Co-ordinate Reference:	Well Van Winkle N-06 HM (slot U)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=753+12 @ 765.00ft
Project:	Marshall County, West Virginia NAD83 UTM 17N	MD Reference:	RKB=753+12 @ 765.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle N-06 HM (slot U)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

Project	Marshall County, West Virginia NAD83 UTM 17N		
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	Van Winkle				
Site Position:		Northing:	14,447,369.493 usft	Latitude:	39.781725330
From:	Lat/Long	Easting:	1,717,188.440 usft	Longitude:	-80.726733270
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "		

Well	Van Winkle N-06 HM (slot U)					
Well Position	+N/-S	0.00 ft	Northing:	14,447,439.354 usft	Latitude:	39.781916000
	+E/-W	0.00 ft	Easting:	1,717,329.898 usft	Longitude:	-80.726229000
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	753.00 ft
Grid Convergence:						

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	6/10/2022	-8.65	66.44	51,648.54405647

Design	rev4				
Audit Notes:		Phase:	PLAN	Tie On Depth:	0.00
Version:		Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
Vertical Section:		0.00	0.00	0.00	330.239

Plan Survey Tool Program		Date			
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	22,356.12 rev4 (Original Hole)			

RECEIVED
Office Of Oil and Gas
MAR 30 2023
WV Department of
Environmental Protection



Planning Report - Geographic

Database:	DB_Feb2822	Local Co-ordinate Reference:	Well Van Winkle N-06 HM (slot U)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=753+12 @ 765.00ft
Project:	Marshall County, West Virginia NAD83 UTM 17N	MD Reference:	RKB=753+12 @ 765.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle N-06 HM (slot U)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

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	
1,312.00	0.00	0.000	1,312.00	0.00	0.00	0.00	0.00	0.00	0.00	135.00
1,487.00	3.50	135.000	1,486.89	-3.78	3.78	2.00	2.00	0.00	0.00	0.00
2,487.00	3.50	135.000	2,485.03	-46.95	46.95	0.00	0.00	0.00	0.00	180.00
2,662.00	0.00	135.000	2,659.92	-50.72	50.72	2.00	-2.00	0.00	0.00	135.00
4,014.08	0.00	135.000	4,012.00	-50.72	50.72	0.00	0.00	0.00	0.00	150.38
4,755.85	14.84	150.382	4,745.51	-133.74	97.92	2.00	2.00	2.07	0.00	0.00
5,349.14	14.84	150.382	5,319.02	-265.80	173.00	0.00	0.00	0.00	0.00	179.79
6,159.58	50.00	330.136	6,051.03	-64.89	57.06	8.00	4.34	22.18	0.01	0.06
6,569.57	91.00	330.178	6,184.99	263.23	-131.16	10.00	10.00	0.01	0.00	0.00
22,356.32	91.00	330.178	5,909.79	13,957.35	-7,980.83	0.00	0.00	0.00	0.00	0.00 Van Winkle N-06HM F



Planning Report - Geographic

Database:	DB_Feb2822	Local Co-ordinate Reference:	Well Van Winkle N-06 HM (slot U)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=753+12 @ 765.00ft
Project:	Marshall County, West Virginia NAD83 UTM 17N	MD Reference:	RKB=753+12 @ 765.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle N-06 HM (slot U)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

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	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
100.00	0.00	0.000	100.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
200.00	0.00	0.000	200.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
300.00	0.00	0.000	300.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
400.00	0.00	0.000	400.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
500.00	0.00	0.000	500.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
600.00	0.00	0.000	600.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
700.00	0.00	0.000	700.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
800.00	0.00	0.000	800.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
900.00	0.00	0.000	900.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
1,000.00	0.00	0.000	1,000.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
1,100.00	0.00	0.000	1,100.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
1,200.00	0.00	0.000	1,200.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
1,300.00	0.00	0.000	1,300.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
1,312.00	0.00	0.000	1,312.00	0.00	0.00	14,447,439.354	1,717,329.898	39.781916000	-80.726229000
KOP Begin 2°/100' build									
1,400.00	1.76	135.000	1,399.99	-0.96	0.96	14,447,438.398	1,717,330.853	39.781913368	-80.726225609
1,487.00	3.50	135.000	1,486.89	-3.78	3.78	14,447,435.576	1,717,333.676	39.781905592	-80.726215592
Begin 3.50° tangent									
1,500.00	3.50	135.000	1,499.87	-4.34	4.34	14,447,435.014	1,717,334.237	39.781904046	-80.726213601
1,600.00	3.50	135.000	1,599.68	-8.66	8.66	14,447,430.698	1,717,338.554	39.781892155	-80.726198283
1,700.00	3.50	135.000	1,699.49	-12.97	12.97	14,447,426.381	1,717,342.871	39.781880264	-80.726182964
1,800.00	3.50	135.000	1,799.31	-17.29	17.29	14,447,422.064	1,717,347.187	39.781868372	-80.726167646
1,900.00	3.50	135.000	1,899.12	-21.61	21.61	14,447,417.747	1,717,351.504	39.781856481	-80.726152328
2,000.00	3.50	135.000	1,998.93	-25.92	25.92	14,447,413.431	1,717,355.821	39.781844590	-80.726137009
2,100.00	3.50	135.000	2,098.75	-30.24	30.24	14,447,409.114	1,717,360.138	39.781832699	-80.726121691
2,200.00	3.50	135.000	2,198.56	-34.56	34.56	14,447,404.797	1,717,364.455	39.781820807	-80.726106373
2,300.00	3.50	135.000	2,298.37	-38.87	38.87	14,447,400.480	1,717,368.771	39.781808916	-80.726091055
2,400.00	3.50	135.000	2,398.19	-43.19	43.19	14,447,396.163	1,717,373.088	39.781797025	-80.726075736
2,487.00	3.50	135.000	2,485.03	-46.95	46.95	14,447,392.408	1,717,376.844	39.781786679	-80.726062409
Begin 2°/100' drop									
2,500.00	3.24	135.000	2,498.00	-47.49	47.49	14,447,391.867	1,717,377.384	39.781785191	-80.726060492
2,600.00	1.24	135.000	2,597.92	-50.25	50.25	14,447,389.104	1,717,380.148	39.781777578	-80.726050685
2,662.00	0.00	135.000	2,659.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
Begin vertical hold									
2,700.00	0.00	135.000	2,697.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
2,800.00	0.00	135.000	2,797.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
2,900.00	0.00	135.000	2,897.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,000.00	0.00	135.000	2,997.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,100.00	0.00	135.000	3,097.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,200.00	0.00	135.000	3,197.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,300.00	0.00	135.000	3,297.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,400.00	0.00	135.000	3,397.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,500.00	0.00	135.000	3,497.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,600.00	0.00	135.000	3,597.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,700.00	0.00	135.000	3,697.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,800.00	0.00	135.000	3,797.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
3,900.00	0.00	135.000	3,897.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
4,000.00	0.00	135.000	3,997.92	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
4,014.08	0.00	0.000	4,012.00	-50.72	50.72	14,447,388.629	1,717,380.622	39.781776271	-80.726049002
Begin 2°/100' build									
4,100.00	1.72	150.382	4,097.90	-51.84	51.36	14,447,387.510	1,717,381.259	39.781773190	-80.726046748
4,200.00	3.72	150.382	4,197.79	-55.97	53.71	14,447,383.387	1,717,383.603	39.781761848	-80.726038450



Planning Report - Geographic

Database: DB_Feb2822
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia NAD83 UTM 17N
 Site: Van Winkle
 Well: Van Winkle N-06 HM (slot U)
 Wellbore: Original Hole
 Design: rev4

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

Well Van Winkle N-06 HM (slot U)
 RKB=753+12 @ 765.00ft
 RKB=753+12 @ 765.00ft
 Grid
 Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,300.00	5.72	150.382	4,297.44	-63.12	57.77	14,447,376.236	1,717,387.668	39.781742177	-80.726024058
4,400.00	7.72	150.382	4,396.75	-73.29	63.55	14,447,366.067	1,717,393.449	39.781714200	-80.726003590
4,500.00	9.72	150.382	4,495.59	-86.46	71.04	14,447,352.890	1,717,400.940	39.781677951	-80.725977070
4,600.00	11.72	150.382	4,593.84	-102.63	80.23	14,447,336.723	1,717,410.131	39.781633474	-80.725944532
4,700.00	13.72	150.382	4,691.38	-121.77	91.11	14,447,317.585	1,717,421.011	39.781580824	-80.725906013
4,755.85	14.84	150.382	4,745.51	-133.74	97.92	14,447,305.611	1,717,427.818	39.781547885	-80.725881915
Begin 14.84° tangent									
4,800.00	14.84	150.382	4,788.18	-143.57	103.51	14,447,295.784	1,717,433.405	39.781520850	-80.725862136
4,900.00	14.84	150.382	4,884.85	-165.83	116.16	14,447,273.526	1,717,446.059	39.781459616	-80.725817338
5,000.00	14.84	150.382	4,981.52	-188.09	128.82	14,447,251.267	1,717,458.713	39.781398381	-80.725772539
5,100.00	14.84	150.382	5,078.18	-210.35	141.47	14,447,229.008	1,717,471.367	39.781337147	-80.725727740
5,200.00	14.84	150.382	5,174.85	-232.60	154.12	14,447,206.750	1,717,484.022	39.781275912	-80.725682942
5,300.00	14.84	150.382	5,271.52	-254.86	166.78	14,447,184.491	1,717,496.676	39.781214677	-80.725638143
5,349.14	14.84	150.382	5,319.02	-265.80	173.00	14,447,173.554	1,717,502.893	39.781184589	-80.725616131
Begin 8°/100' build/turn									
5,400.00	10.77	150.461	5,368.61	-275.60	178.56	14,447,163.756	1,717,508.456	39.781157634	-80.725596438
5,450.00	6.77	150.629	5,418.01	-282.23	182.31	14,447,157.123	1,717,512.205	39.781139387	-80.725583167
5,500.00	2.77	151.282	5,467.83	-285.86	184.33	14,447,153.497	1,717,514.230	39.781129410	-80.725575998
5,550.00	1.23	327.711	5,517.81	-286.46	184.63	14,447,152.894	1,717,514.522	39.781127752	-80.725574964
5,600.00	5.23	329.600	5,567.72	-284.04	183.18	14,447,155.317	1,717,513.080	39.781134420	-80.725580072
5,650.00	9.23	329.853	5,617.32	-278.60	180.01	14,447,160.756	1,717,509.910	39.781149381	-80.725591297
5,700.00	13.23	329.954	5,666.35	-270.17	175.13	14,447,169.182	1,717,505.027	39.781172564	-80.725608583
5,750.00	17.23	330.009	5,714.58	-258.80	168.56	14,447,180.556	1,717,498.457	39.781203855	-80.725660973
5,800.00	21.23	330.044	5,761.78	-244.53	160.33	14,447,194.822	1,717,490.230	39.781243102	-80.725695823
5,850.00	25.23	330.068	5,807.72	-227.44	150.49	14,447,211.910	1,717,480.387	39.781344659	-80.725736225
5,900.00	29.23	330.086	5,852.16	-207.62	139.08	14,447,231.737	1,717,468.975	39.781406475	-80.725781983
5,950.00	33.23	330.099	5,894.91	-185.15	126.15	14,447,254.206	1,717,456.051	39.781475259	-80.725832874
6,000.00	37.23	330.111	5,935.74	-160.15	111.78	14,447,279.209	1,717,441.677	39.781475259	-80.725888649
6,050.00	41.23	330.120	5,974.46	-132.73	96.03	14,447,306.622	1,717,425.923	39.781550677	-80.725949037
6,100.00	45.23	330.128	6,010.88	-103.04	78.97	14,447,336.314	1,717,408.867	39.781632361	-80.726013745
6,150.00	49.23	330.135	6,044.83	-71.22	60.69	14,447,368.138	1,717,390.590	39.781719912	-80.726026606
6,159.58	50.00	330.136	6,051.03	-64.89	57.06	14,447,374.464	1,717,386.958	39.781737316	-80.726026606
Begin 10°/100' build/turn									
6,200.00	54.04	330.142	6,075.90	-37.26	41.20	14,447,402.091	1,717,371.096	39.781813320	-80.726082762
6,250.00	59.04	330.148	6,103.46	-1.10	20.44	14,447,438.258	1,717,350.337	39.781912819	-80.726156260
6,300.00	64.04	330.153	6,127.28	37.02	-1.43	14,447,476.373	1,717,328.465	39.782017675	-80.726233698
6,350.00	69.04	330.158	6,147.17	76.79	-24.25	14,447,516.145	1,717,305.646	39.782127092	-80.726314486
6,400.00	74.04	330.163	6,163.00	117.92	-47.84	14,447,557.272	1,717,282.055	39.782240236	-80.726398010
6,450.00	79.04	330.168	6,174.63	160.09	-72.03	14,447,599.441	1,717,257.871	39.782356245	-80.726483633
6,500.00	84.04	330.172	6,181.98	202.98	-96.62	14,447,642.330	1,717,233.278	39.782474238	-80.726570706
6,550.00	89.04	330.176	6,185.00	246.26	-121.43	14,447,685.615	1,717,208.463	39.782593317	-80.726658564
6,569.57	91.00	330.178	6,184.99	263.23	-131.16	14,447,702.588	1,717,198.733	39.782640012	-80.726693012
Begin 91.00° lateral									
6,600.00	91.00	330.178	6,184.46	289.64	-146.30	14,447,728.988	1,717,183.600	39.782712641	-80.726746591
6,700.00	91.00	330.178	6,182.72	376.38	-196.02	14,447,815.733	1,717,133.877	39.782951280	-80.726922637
6,800.00	91.00	330.178	6,180.97	463.12	-245.74	14,447,902.477	1,717,084.154	39.783189918	-80.727098685
6,900.00	91.00	330.178	6,179.23	549.87	-295.47	14,447,989.221	1,717,034.431	39.783428557	-80.727274734
7,000.00	91.00	330.178	6,177.49	636.61	-345.19	14,448,075.965	1,716,984.708	39.783667195	-80.727450784
7,100.00	91.00	330.178	6,175.74	723.36	-394.91	14,448,162.709	1,716,934.985	39.783905833	-80.727626835
7,200.00	91.00	330.178	6,174.00	810.10	-444.64	14,448,249.453	1,716,885.262	39.784144471	-80.727802887
7,300.00	91.00	330.178	6,172.26	896.85	-494.36	14,448,336.197	1,716,835.539	39.784383108	-80.727978941
7,400.00	91.00	330.178	6,170.51	983.59	-544.08	14,448,422.942	1,716,785.816	39.784621745	-80.728154996
7,500.00	91.00	330.178	6,168.77	1,070.33	-593.81	14,448,509.686	1,716,736.093	39.784860382	-80.728331052



Planning Report - Geographic

Database: DB_Feb2822
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia NAD83 UTM
 17N
 Site: Van Winkle
 Well: Van Winkle N-06 HM (slot U)
 Wellbore: Original Hole
 Design: rev4

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

Well Van Winkle N-06 HM (slot U)
 RKB=753+12 @ 765.00ft
 RKB=753+12 @ 765.00ft
 Grid
 Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
7,600.00	91.00	330.178	6,167.03	1,157.08	-643.53	14,448,596.430	1,716,686.370	39.785099019	-80.728507109
7,700.00	91.00	330.178	6,165.28	1,243.82	-693.25	14,448,683.174	1,716,636.647	39.785337655	-80.728683168
7,800.00	91.00	330.178	6,163.54	1,330.57	-742.97	14,448,769.918	1,716,586.924	39.785576291	-80.728859228
7,900.00	91.00	330.178	6,161.80	1,417.31	-792.70	14,448,856.662	1,716,537.201	39.785814927	-80.729035289
8,000.00	91.00	330.178	6,160.05	1,504.06	-842.42	14,448,943.406	1,716,487.478	39.786053562	-80.729211351
8,100.00	91.00	330.178	6,158.31	1,590.80	-892.14	14,449,030.151	1,716,437.756	39.786292197	-80.729387414
8,200.00	91.00	330.178	6,156.57	1,677.54	-941.87	14,449,116.895	1,716,388.033	39.786530832	-80.729563479
8,300.00	91.00	330.178	6,154.82	1,764.29	-991.59	14,449,203.639	1,716,338.310	39.786769467	-80.729739545
8,400.00	91.00	330.178	6,153.08	1,851.03	-1,041.31	14,449,290.383	1,716,288.587	39.787246735	-80.729915612
8,500.00	91.00	330.178	6,151.34	1,937.78	-1,091.04	14,449,377.127	1,716,238.864	39.787485369	-80.730091680
8,600.00	91.00	330.178	6,149.59	2,024.52	-1,140.76	14,449,463.871	1,716,189.141	39.787724003	-80.730267749
8,700.00	91.00	330.178	6,147.85	2,111.27	-1,190.48	14,449,550.615	1,716,139.418	39.787962636	-80.730443820
8,800.00	91.00	330.178	6,146.11	2,198.01	-1,240.21	14,449,637.359	1,716,089.695	39.788201269	-80.730619892
8,900.00	91.00	330.178	6,144.36	2,284.75	-1,289.93	14,449,724.104	1,716,039.972	39.788439902	-80.730795965
9,000.00	91.00	330.178	6,142.62	2,371.50	-1,339.65	14,449,810.848	1,715,990.249	39.788678534	-80.730972039
9,100.00	91.00	330.178	6,140.88	2,458.24	-1,389.37	14,449,897.592	1,715,940.526	39.788917166	-80.731148115
9,200.00	91.00	330.178	6,139.14	2,544.99	-1,439.10	14,449,984.336	1,715,890.803	39.789155798	-80.731324192
9,300.00	91.00	330.178	6,137.39	2,631.73	-1,488.82	14,450,071.080	1,715,841.079	39.789394430	-80.731500269
9,400.00	91.00	330.178	6,135.65	2,718.48	-1,538.54	14,450,157.824	1,715,791.356	39.789633061	-80.731676349
9,500.00	91.00	330.178	6,133.91	2,805.22	-1,588.27	14,450,244.568	1,715,741.633	39.789871693	-80.731852429
9,600.00	91.00	330.178	6,132.16	2,891.96	-1,637.99	14,450,331.313	1,715,691.910	39.7899110323	-80.732028511
9,700.00	91.00	330.178	6,130.42	2,978.71	-1,687.71	14,450,418.057	1,715,642.187	39.790110323	-80.732204593
9,800.00	91.00	330.178	6,128.68	3,065.45	-1,737.44	14,450,504.801	1,715,592.464	39.790348954	-80.732380677
9,900.00	91.00	330.178	6,126.93	3,152.20	-1,787.16	14,450,591.545	1,715,542.741	39.790587584	-80.732556763
10,000.00	91.00	330.178	6,125.19	3,238.94	-1,836.88	14,450,678.289	1,715,493.018	39.790826214	-80.732732849
10,100.00	91.00	330.178	6,123.45	3,325.69	-1,886.61	14,450,765.033	1,715,443.295	39.791064844	-80.732908937
10,200.00	91.00	330.178	6,121.70	3,412.43	-1,936.33	14,450,851.777	1,715,393.572	39.791303473	-80.733085026
10,300.00	91.00	330.178	6,119.96	3,499.17	-1,986.05	14,450,938.522	1,715,343.849	39.791542103	-80.733261116
10,400.00	91.00	330.178	6,118.22	3,585.92	-2,035.77	14,451,025.266	1,715,294.126	39.791780732	-80.733437207
10,500.00	91.00	330.178	6,116.47	3,672.66	-2,085.50	14,451,112.010	1,715,244.403	39.792019360	-80.733613299
10,600.00	91.00	330.178	6,114.73	3,759.41	-2,135.22	14,451,198.754	1,715,194.680	39.792257989	-80.733789393
10,700.00	91.00	330.178	6,112.99	3,846.15	-2,184.94	14,451,285.498	1,715,144.957	39.792496617	-80.733965488
10,800.00	91.00	330.178	6,111.24	3,932.90	-2,234.67	14,451,372.242	1,715,095.234	39.792735245	-80.734141584
10,900.00	91.00	330.178	6,109.50	4,019.64	-2,284.39	14,451,458.986	1,715,045.511	39.792973872	-80.734317682
11,000.00	91.00	330.178	6,107.76	4,106.39	-2,334.11	14,451,545.730	1,714,995.788	39.793212499	-80.734493780
11,100.00	91.00	330.178	6,106.01	4,193.13	-2,383.84	14,451,632.475	1,714,946.065	39.793451126	-80.734669880
11,200.00	91.00	330.178	6,104.27	4,279.87	-2,433.56	14,451,719.219	1,714,896.342	39.793689753	-80.734845981
11,300.00	91.00	330.178	6,102.53	4,366.62	-2,483.28	14,451,805.963	1,714,846.619	39.793928380	-80.735022083
11,400.00	91.00	330.178	6,100.78	4,453.36	-2,533.01	14,451,892.707	1,714,796.896	39.794167006	-80.735198187
11,500.00	91.00	330.178	6,099.04	4,540.11	-2,582.73	14,451,979.451	1,714,747.173	39.794405632	-80.735374291
11,600.00	91.00	330.178	6,097.30	4,626.85	-2,632.45	14,452,066.195	1,714,697.450	39.794644257	-80.735550397
11,700.00	91.00	330.178	6,095.55	4,713.60	-2,682.18	14,452,152.939	1,714,647.727	39.794882883	-80.735726504
11,800.00	91.00	330.178	6,093.81	4,800.34	-2,731.90	14,452,239.684	1,714,598.004	39.795121508	-80.735902613
11,900.00	91.00	330.178	6,092.07	4,887.08	-2,781.62	14,452,326.428	1,714,548.281	39.795360133	-80.736078722
12,000.00	91.00	330.178	6,090.32	4,973.83	-2,831.34	14,452,413.172	1,714,498.558	39.795598757	-80.736254833
12,100.00	91.00	330.178	6,088.58	5,060.57	-2,881.07	14,452,499.916	1,714,448.835	39.795837380	-80.736430945
12,200.00	91.00	330.178	6,086.84	5,147.32	-2,930.79	14,452,586.660	1,714,399.112	39.796076004	-80.736607058
12,300.00	91.00	330.178	6,085.10	5,234.06	-2,980.51	14,452,673.404	1,714,349.389	39.796314628	-80.736783172
12,400.00	91.00	330.178	6,083.35	5,320.81	-3,030.24	14,452,760.148	1,714,299.666	39.796553252	-80.736959288
12,500.00	91.00	330.178	6,081.61	5,407.55	-3,079.96	14,452,846.893	1,714,249.943	39.796791875	-80.737135405
12,600.00	91.00	330.178	6,079.87	5,494.29	-3,129.68	14,452,933.637	1,714,200.220	39.797030498	-80.737311523
12,700.00	91.00	330.178	6,078.12	5,581.04	-3,179.41	14,453,020.381	1,714,150.497	39.797269120	-80.737487642
12,800.00	91.00	330.178	6,076.38	5,667.78	-3,229.13	14,453,107.125	1,714,100.774	39.797507743	-80.737663762
12,900.00	91.00	330.178	6,074.64	5,754.53	-3,278.85	14,453,193.869	1,714,051.051	39.797746365	-80.737839884



Planning Report - Geographic

Database: DB_Feb2822
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia NAD83 UTM
 17N
 Site: Van Winkle
 Well: Van Winkle N-06 HM (slot U)
 Wellbore: Original Hole
 Design: rev4

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

Well Van Winkle N-06 HM (slot U)
 RKB=753+12 @ 765.00ft
 RKB=753+12 @ 765.00ft
 Grid
 Minimum Curvature

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	330.178	6,072.89	5,841.27	-3,328.58	14,453,280.613	1,714,001.328	39.797984987	-80.738016007
13,100.00	91.00	330.178	6,071.15	5,928.02	-3,378.30	14,453,367.357	1,713,951.605	39.798223608	-80.738192131
13,200.00	91.00	330.178	6,069.41	6,014.76	-3,428.02	14,453,454.103	1,713,901.882	39.798462229	-80.738368256
13,300.00	91.00	330.178	6,067.66	6,101.50	-3,477.74	14,453,540.847	1,713,852.159	39.798700850	-80.738544383
13,400.00	91.00	330.178	6,065.92	6,188.25	-3,527.47	14,453,627.591	1,713,802.436	39.798939471	-80.738720510
13,500.00	91.00	330.178	6,064.18	6,274.99	-3,577.19	14,453,714.335	1,713,752.713	39.799178092	-80.738896639
13,600.00	91.00	330.178	6,062.43	6,361.74	-3,626.91	14,453,801.079	1,713,702.991	39.799416712	-80.739072769
13,700.00	91.00	330.178	6,060.69	6,448.48	-3,676.64	14,453,887.823	1,713,653.268	39.799655332	-80.739248901
13,800.00	91.00	330.178	6,058.95	6,535.23	-3,726.36	14,453,974.567	1,713,603.545	39.799893951	-80.739425033
13,900.00	91.00	330.178	6,057.20	6,621.97	-3,776.08	14,454,061.311	1,713,553.822	39.800132571	-80.739601167
14,000.00	91.00	330.178	6,055.46	6,708.71	-3,825.81	14,454,148.056	1,713,504.099	39.800371190	-80.739777302
14,100.00	91.00	330.178	6,053.72	6,795.46	-3,875.53	14,454,234.800	1,713,454.376	39.800609809	-80.739953438
14,200.00	91.00	330.178	6,051.97	6,882.20	-3,925.25	14,454,321.544	1,713,404.653	39.800848427	-80.740129576
14,300.00	91.00	330.178	6,050.23	6,968.95	-3,974.98	14,454,408.288	1,713,354.930	39.801087045	-80.740305714
14,400.00	91.00	330.178	6,048.49	7,055.69	-4,024.70	14,454,495.032	1,713,305.207	39.801325663	-80.740481854
14,500.00	91.00	330.178	6,046.74	7,142.44	-4,074.42	14,454,581.776	1,713,255.484	39.801564281	-80.740657994
14,600.00	91.00	330.178	6,045.00	7,229.18	-4,124.14	14,454,668.520	1,713,205.761	39.801802899	-80.740834137
14,700.00	91.00	330.178	6,043.26	7,315.92	-4,173.87	14,454,755.265	1,713,156.038	39.802041516	-80.741010280
14,800.00	91.00	330.178	6,041.51	7,402.67	-4,223.59	14,454,842.009	1,713,106.315	39.802280133	-80.741186425
14,900.00	91.00	330.178	6,039.77	7,489.41	-4,273.31	14,454,928.753	1,713,056.592	39.802518749	-80.741362571
15,000.00	91.00	330.178	6,038.03	7,576.16	-4,323.04	14,455,015.497	1,713,006.869	39.802757366	-80.741538718
15,100.00	91.00	330.178	6,036.28	7,662.90	-4,372.76	14,455,102.241	1,712,957.146	39.802995982	-80.741714866
15,200.00	91.00	330.178	6,034.54	7,749.65	-4,422.48	14,455,188.985	1,712,907.423	39.803234598	-80.741891016
15,300.00	91.00	330.178	6,032.80	7,836.39	-4,472.21	14,455,275.729	1,712,857.700	39.803473213	-80.742067167
15,400.00	91.00	330.178	6,031.05	7,923.13	-4,521.93	14,455,362.474	1,712,807.977	39.803711828	-80.742243319
15,500.00	91.00	330.178	6,029.31	8,009.88	-4,571.65	14,455,449.218	1,712,758.254	39.803950443	-80.742419472
15,600.00	91.00	330.178	6,027.57	8,096.62	-4,621.38	14,455,535.962	1,712,708.531	39.804189058	-80.742595626
15,700.00	91.00	330.178	6,025.83	8,183.37	-4,671.10	14,455,622.706	1,712,658.808	39.804427673	-80.742771782
15,800.00	91.00	330.178	6,024.08	8,270.11	-4,720.82	14,455,709.450	1,712,609.085	39.804666287	-80.742947939
15,900.00	91.00	330.178	6,022.34	8,356.86	-4,770.54	14,455,796.194	1,712,559.362	39.804904901	-80.743124097
16,000.00	91.00	330.178	6,020.60	8,443.60	-4,820.27	14,455,882.938	1,712,509.639	39.805143514	-80.743300256
16,100.00	91.00	330.178	6,018.85	8,530.35	-4,869.99	14,455,969.682	1,712,459.916	39.805382128	-80.743476417
16,200.00	91.00	330.178	6,017.11	8,617.09	-4,919.71	14,456,056.427	1,712,410.193	39.805620741	-80.743652579
16,300.00	91.00	330.178	6,015.37	8,703.83	-4,969.44	14,456,143.171	1,712,360.470	39.805859353	-80.743828741
16,400.00	91.00	330.178	6,013.62	8,790.58	-5,019.16	14,456,229.915	1,712,310.747	39.806097966	-80.744004906
16,500.00	91.00	330.178	6,011.88	8,877.32	-5,068.88	14,456,316.659	1,712,261.024	39.806336578	-80.744181071
16,600.00	91.00	330.178	6,010.14	8,964.07	-5,118.61	14,456,403.403	1,712,211.301	39.806575190	-80.744357238
16,700.00	91.00	330.178	6,008.39	9,050.81	-5,168.33	14,456,490.147	1,712,161.578	39.806813802	-80.744533405
16,800.00	91.00	330.178	6,006.65	9,137.56	-5,218.05	14,456,576.891	1,712,111.855	39.807052413	-80.744709574
16,900.00	91.00	330.178	6,004.91	9,224.30	-5,267.78	14,456,663.636	1,712,062.132	39.807291025	-80.744885745
17,000.00	91.00	330.178	6,003.16	9,311.04	-5,317.50	14,456,750.380	1,712,012.409	39.807529635	-80.745061916
17,100.00	91.00	330.178	6,001.42	9,397.79	-5,367.22	14,456,837.124	1,711,962.686	39.807768246	-80.745238089
17,200.00	91.00	330.178	5,999.68	9,484.53	-5,416.94	14,456,923.868	1,711,912.963	39.808006856	-80.745414263
17,300.00	91.00	330.178	5,997.93	9,571.28	-5,466.67	14,457,010.612	1,711,863.240	39.808245466	-80.745590438
17,400.00	91.00	330.178	5,996.19	9,658.02	-5,516.39	14,457,097.356	1,711,813.517	39.808484076	-80.745766614
17,500.00	91.00	330.178	5,994.45	9,744.77	-5,566.11	14,457,184.100	1,711,763.794	39.808722686	-80.745942792
17,600.00	91.00	330.178	5,992.70	9,831.51	-5,615.84	14,457,270.845	1,711,714.071	39.808961295	-80.746118970
17,700.00	91.00	330.178	5,990.96	9,918.25	-5,665.56	14,457,357.589	1,711,664.348	39.809199904	-80.746295150
17,800.00	91.00	330.178	5,989.22	10,005.00	-5,715.28	14,457,444.333	1,711,614.625	39.809438513	-80.746471331
17,900.00	91.00	330.178	5,987.47	10,091.74	-5,765.01	14,457,531.077	1,711,564.902	39.809677121	-80.746647514
18,000.00	91.00	330.178	5,985.73	10,178.49	-5,814.73	14,457,617.821	1,711,515.179	39.809915729	-80.746823697
18,100.00	91.00	330.178	5,983.99	10,265.23	-5,864.45	14,457,704.565	1,711,465.456	39.810154337	-80.746999882
18,200.00	91.00	330.178	5,982.24	10,351.98	-5,914.18	14,457,791.309	1,711,415.733	39.810392945	-80.747176068
18,300.00	91.00	330.178	5,980.50	10,438.72	-5,963.90	14,457,878.053	1,711,366.010	39.810631552	-80.747352255



Planning Report - Geographic

Database:	DB_Feb2822	Local Co-ordinate Reference:	Well Van Winkle N-06 HM (slot U)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=753+12 @ 765.00ft
Project:	Marshall County, West Virginia NAD83 UTM 17N	MD Reference:	RKB=753+12 @ 765.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle N-06 HM (slot U)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
18,400.00	91.00	330.178	5,978.76	10,525.46	-6,013.62	14,457,964.798	1,711,316.287	39.810870159	-80.747528444
18,500.00	91.00	330.178	5,977.01	10,612.21	-6,063.34	14,458,051.542	1,711,266.564	39.811108766	-80.747704634
18,600.00	91.00	330.178	5,975.27	10,698.95	-6,113.07	14,458,138.286	1,711,216.841	39.811347372	-80.747880824
18,700.00	91.00	330.178	5,973.53	10,785.70	-6,162.79	14,458,225.030	1,711,167.118	39.811585979	-80.748057017
18,800.00	91.00	330.178	5,971.79	10,872.44	-6,212.51	14,458,311.774	1,711,117.395	39.811824585	-80.748233210
18,900.00	91.00	330.178	5,970.04	10,959.19	-6,262.24	14,458,398.518	1,711,067.672	39.812063190	-80.748409404
19,000.00	91.00	330.178	5,968.30	11,045.93	-6,311.96	14,458,485.262	1,711,017.949	39.812301796	-80.748585600
19,100.00	91.00	330.178	5,966.56	11,132.67	-6,361.68	14,458,572.007	1,710,968.227	39.812540401	-80.748761797
19,200.00	91.00	330.178	5,964.81	11,219.42	-6,411.41	14,458,658.751	1,710,918.504	39.812779006	-80.748937995
19,300.00	91.00	330.178	5,963.07	11,306.16	-6,461.13	14,458,745.495	1,710,868.781	39.813017610	-80.749114195
19,400.00	91.00	330.178	5,961.33	11,392.91	-6,510.85	14,458,832.239	1,710,819.058	39.813256215	-80.749290395
19,500.00	91.00	330.178	5,959.58	11,479.65	-6,560.58	14,458,918.983	1,710,769.335	39.813494819	-80.749466597
19,600.00	91.00	330.178	5,957.84	11,566.40	-6,610.30	14,459,005.727	1,710,719.612	39.813733423	-80.749642800
19,700.00	91.00	330.178	5,956.10	11,653.14	-6,660.02	14,459,092.471	1,710,669.889	39.813972026	-80.749819005
19,800.00	91.00	330.178	5,954.35	11,739.88	-6,709.74	14,459,179.216	1,710,620.166	39.814210629	-80.749995210
19,900.00	91.00	330.178	5,952.61	11,826.63	-6,759.47	14,459,265.960	1,710,570.443	39.814449232	-80.750171417
20,000.00	91.00	330.178	5,950.87	11,913.37	-6,809.19	14,459,352.704	1,710,520.720	39.814687835	-80.750347625
20,100.00	91.00	330.178	5,949.12	12,000.12	-6,858.91	14,459,439.448	1,710,470.997	39.814926437	-80.750523834
20,200.00	91.00	330.178	5,947.38	12,086.86	-6,908.64	14,459,526.192	1,710,421.274	39.815165039	-80.750700044
20,300.00	91.00	330.178	5,945.64	12,173.61	-6,958.36	14,459,612.936	1,710,371.551	39.815403641	-80.750876256
20,400.00	91.00	330.178	5,943.89	12,260.35	-7,008.08	14,459,699.680	1,710,321.828	39.815642243	-80.751052468
20,500.00	91.00	330.178	5,942.15	12,347.10	-7,057.81	14,459,786.425	1,710,272.105	39.815880844	-80.751228682
20,600.00	91.00	330.178	5,940.41	12,433.84	-7,107.53	14,459,873.169	1,710,222.382	39.816119445	-80.751404898
20,700.00	91.00	330.178	5,938.66	12,520.58	-7,157.25	14,459,959.913	1,710,172.659	39.816358046	-80.751581114
20,800.00	91.00	330.178	5,936.92	12,607.33	-7,206.98	14,460,046.657	1,710,122.936	39.816596647	-80.751757332
20,900.00	91.00	330.178	5,935.18	12,694.07	-7,256.70	14,460,133.401	1,710,073.213	39.816835247	-80.751933550
21,000.00	91.00	330.178	5,933.43	12,780.82	-7,306.42	14,460,220.145	1,710,023.490	39.817073847	-80.752109771
21,100.00	91.00	330.178	5,931.69	12,867.56	-7,356.14	14,460,306.889	1,709,973.767	39.817312446	-80.752285992
21,200.00	91.00	330.178	5,929.95	12,954.31	-7,405.87	14,460,393.633	1,709,924.044	39.817551046	-80.752462214
21,300.00	91.00	330.178	5,928.20	13,041.05	-7,455.59	14,460,480.378	1,709,874.321	39.817789645	-80.752638438
21,400.00	91.00	330.178	5,926.46	13,127.79	-7,505.31	14,460,567.122	1,709,824.598	39.818028244	-80.752814663
21,500.00	91.00	330.178	5,924.72	13,214.54	-7,555.04	14,460,653.866	1,709,774.875	39.818266842	-80.752990889
21,600.00	91.00	330.178	5,922.97	13,301.28	-7,604.76	14,460,740.610	1,709,725.152	39.818505441	-80.753167116
21,700.00	91.00	330.178	5,921.23	13,388.03	-7,654.48	14,460,827.354	1,709,675.429	39.818744039	-80.753343345
21,800.00	91.00	330.178	5,919.49	13,474.77	-7,704.21	14,460,914.098	1,709,625.706	39.818982636	-80.753519575
21,900.00	91.00	330.178	5,917.74	13,561.52	-7,753.93	14,461,000.842	1,709,575.983	39.819221234	-80.753695806
22,000.00	91.00	330.178	5,916.00	13,648.26	-7,803.65	14,461,087.587	1,709,526.260	39.819459831	-80.753872038
22,100.00	91.00	330.178	5,914.26	13,735.00	-7,853.38	14,461,174.331	1,709,476.537	39.819698428	-80.754048271
22,200.00	91.00	330.178	5,912.52	13,821.75	-7,903.10	14,461,261.075	1,709,426.814	39.819937025	-80.754224506
22,300.00	91.00	330.178	5,910.77	13,908.49	-7,952.82	14,461,347.819	1,709,377.091	39.820175621	-80.754400742
22,356.32	91.00	330.178	5,909.79	13,957.35	-7,980.83	14,461,396.674	1,709,349.087	39.820310000	-80.754500000

PBHL/TD 22356.32 MD 5909.79 TVD



Planning Report - Geographic

Database:	DB_Feb2822	Local Co-ordinate Reference:	Well Van Winkle N-06 HM (slot U)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=753+12 @ 765.00ft
Project:	Marshall County, West Virginia NAD83 UTM 17N	MD Reference:	RKB=753+12 @ 765.00ft
Site:	Van Winkle	North Reference:	Grid
Well:	Van Winkle N-06 HM (slot U)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

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
Van Winkle N-06HM PBI - plan hits target center - Point	0.00	0.000	5,909.79	13,957.35	-7,980.83	14,461,396.674	1,709,349.087	39.820310000	-80.754500000
Van Winkle N-06HM LP - plan misses target center by 0.01ft at 6569.56ft MD (6184.99 TVD, 263.23 N, -131.16 E) - Point	0.00	0.000	6,185.00	263.23	-131.16	14,447,702.584	1,717,198.737	39.782640000	-80.726693000

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,312.00	1,312.00	0.00	0.00	KOP Begin 2°/100' build
1,487.00	1,486.89	-3.78	3.78	Begin 3.50° tangent
2,487.00	2,485.03	-46.95	46.95	Begin 2°/100' drop
2,662.00	2,659.92	-50.72	50.72	Begin vertical hold
4,014.08	4,012.00	-50.72	50.72	Begin 2°/100' build
4,755.85	4,745.51	-133.74	97.92	Begin 14.84° tangent
5,349.14	5,319.02	-265.80	173.00	Begin 8°/100' build/turn
6,159.58	6,051.03	-64.89	57.06	Begin 10°/100' build/turn
6,569.57	6,184.99	263.23	-131.16	Begin 91.00° lateral
22,356.32	5,909.79	13,957.35	-7,980.83	PBHL/TD 22356.32 MD 5909.79 TVD