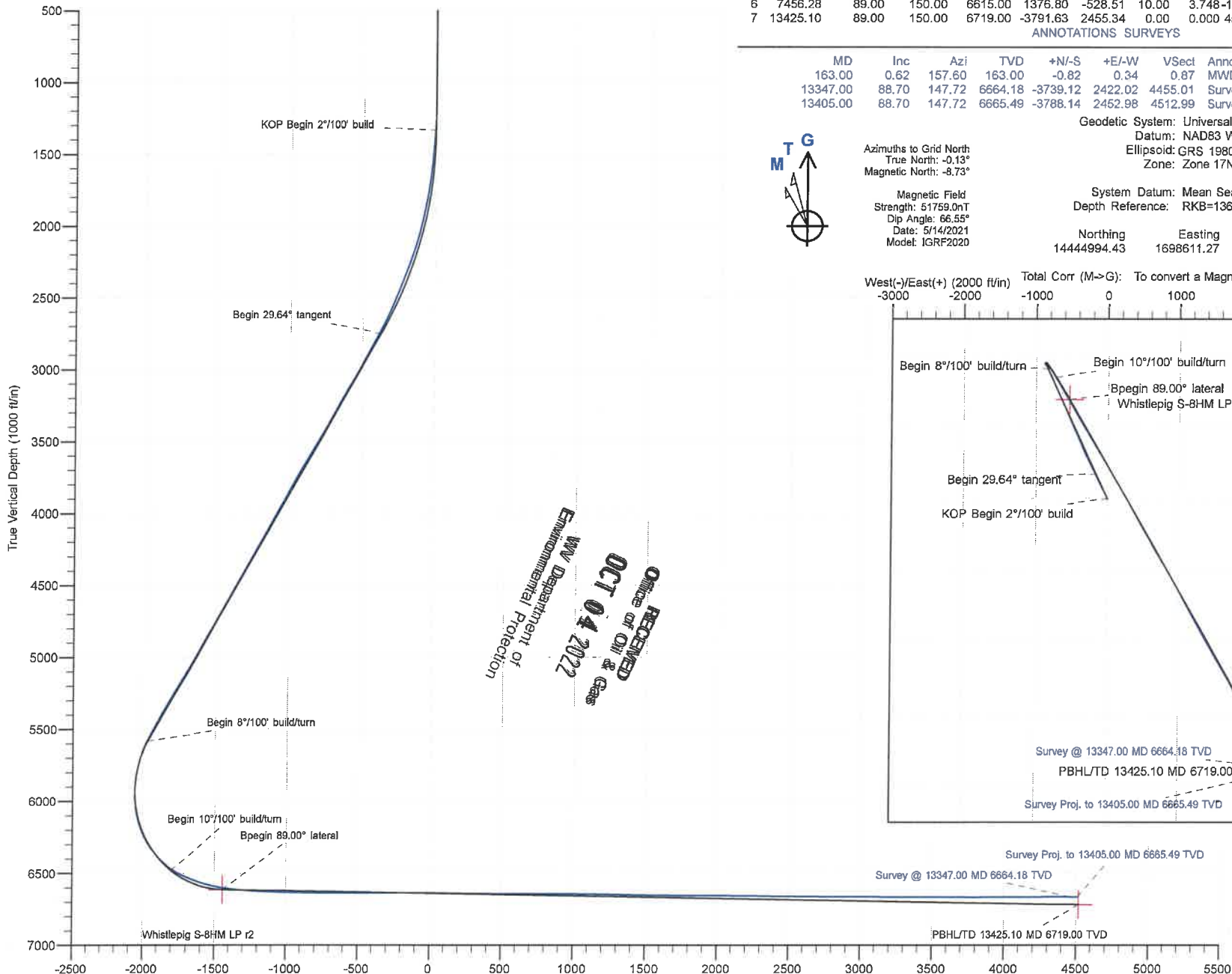




Well: Whistlepig S-08HM (slot E)
 Site: Whistlepig
 Project: Marshall County, West Virginia
 Design: rev2
 Rig: Nabors X14



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SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V Sect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	
2	1333.50	0.00	0.00	1333.50	0.00	0.00	0.00	0.000	0.00	KOP Begin 2°/100' build
3	2815.70	29.64	335.17	2750.45	340.30	-157.45	2.00	335.171	-371.22	Begin 29.64° tangent
4	6072.50	29.64	335.17	5580.99	1802.24	-833.86	0.00	0.000	-1966.00	Begin 8°/100' build/turn
5	7065.67	50.00	147.64	6480.82	1684.29	-713.44	8.00	174.138	-1801.54	Begin 10°/100' build/turn
6	7456.28	89.00	150.00	6615.00	1376.80	-528.51	10.00	3.748	-1442.92	Bbegin 89.00° lateral
7	13425.10	89.00	150.00	6719.00	-3791.63	2455.34	0.00	0.000	4517.21	PBHL/TD 13425.10 MD 6719.00 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	V Sect	Annotation
163.00	0.62	157.60	163.00	-0.82	0.34	0.87	MWD surveys
13347.00	88.70	147.72	6664.18	-3739.12	2422.02	4455.01	Survey @ 13347.00 MD 6664.18 TVD
13405.00	88.70	147.72	6665.49	-3788.14	2452.98	4512.99	Survey Proj. to 13405.00 MD 6665.49 TVD

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

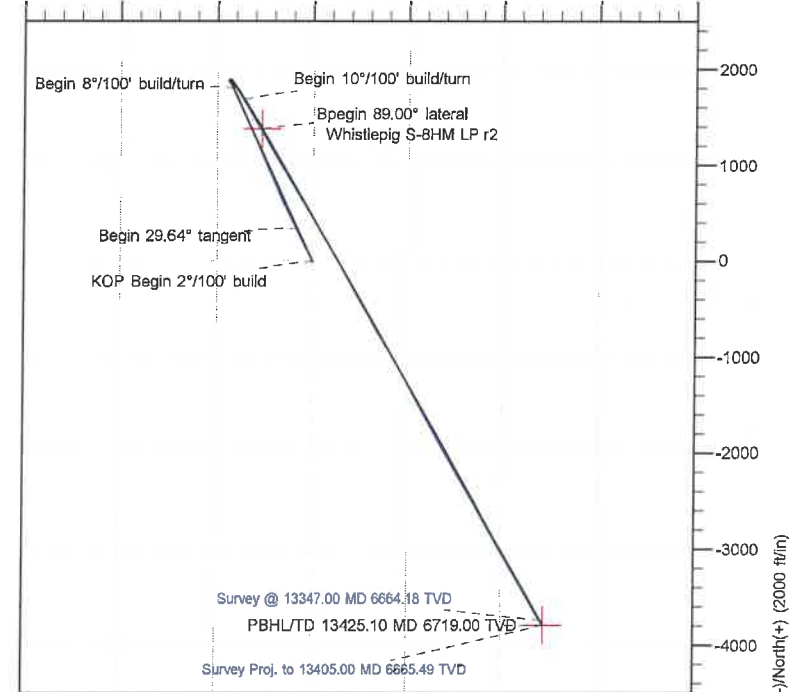


Azimuths to Grid North
 True North: -0.13°
 Magnetic North: -8.73°
 Magnetic Field
 Strength: 51759.0nT
 Dip Angle: 66.55°
 Date: 5/14/2021
 Model: IGRF2020

System Datum: Mean Sea Level
 Depth Reference: RKB=1368+32.5 @ 1400.50ft (Nabors X14)

Northing	Easting	Latitude	Longitude
14444994.43	1698611.27	39.77533961	-80.79287721

West(-)/East(+) (2000 ft/in) Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.73°



Survey Proj. to 13405.00 MD 6665.49 TVD
 Survey @ 13347.00 MD 6664.18 TVD

PBHL/TD 13425.10 MD 6719.00 TVD



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

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

Site	Whistlepig				
Site Position:		Northing:	14,444,965.96 usft	Latitude:	39.77526165
From:	Lat/Long	Easting:	1,698,572.65 usft	Longitude:	-80.79301490
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "		

Well	Whistlepig S-08HM (slot E)					
Well Position	+N/-S	0.00 ft	Northing:	14,444,994.44 usft	Latitude:	39.77533961
	+E/-W	0.00 ft	Easting:	1,698,611.27 usft	Longitude:	-80.79287721
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	1,368.00 ft
Grid Convergence:	0.133 °					

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2020	5/14/2021	(°)	(°)	(nT)
			-8.602	66.550	979459

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.00	0.00	0.00	147.07	

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Survey Program	Date	6/1/2021			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
163.00	1,097.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,129.00	2,863.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,971.00	13,347.00	MWD (Original Hole)	MWD	MWD - Standard	
13,405.00	13,405.00	Projection (Original Hole)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
163.00	0.62	157.60	163.00	-0.82	0.34	0.87	0.38	0.38	0.00	
MWD surveys										
194.00	0.62	186.30	194.00	-1.14	0.38	1.16	0.99	0.00	92.58	
241.00	0.43	213.37	240.99	-1.54	0.26	1.43	0.65	-0.40	57.60	
284.00	0.35	196.93	283.99	-1.80	0.13	1.58	0.32	-0.19	-38.23	
331.00	0.40	210.29	330.99	-2.08	0.01	1.75	0.21	0.11	28.43	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
374.00	0.40	208.10	373.99	-2.34	-0.14	1.89	0.04	0.00	-5.09
421.00	0.40	205.02	420.99	-2.63	-0.29	2.05	0.05	0.00	-6.55
465.00	0.31	221.02	464.99	-2.86	-0.43	2.17	0.30	-0.20	36.36
512.00	0.35	210.20	511.99	-3.08	-0.59	2.27	0.16	0.09	-23.02
556.00	0.48	226.38	555.99	-3.32	-0.79	2.36	0.40	0.30	36.77
603.00	0.44	225.24	602.98	-3.59	-1.06	2.44	0.09	-0.09	-2.43
646.00	0.26	238.42	645.98	-3.75	-1.26	2.47	0.46	-0.42	30.65
693.00	0.22	215.13	692.98	-3.88	-1.40	2.50	0.22	-0.09	-49.55
738.00	0.31	211.96	737.98	-4.06	-1.52	2.58	0.20	0.20	-7.04
772.00	0.31	195.88	771.98	-4.22	-1.59	2.68	0.26	0.00	-47.29
832.00	0.35	228.14	831.98	-4.50	-1.77	2.82	0.31	0.07	53.77
879.00	0.22	210.82	878.98	-4.68	-1.92	2.88	0.33	-0.28	-36.85
926.00	0.35	221.19	925.98	-4.86	-2.06	2.96	0.30	0.28	22.06
1,020.00	0.31	224.44	1,019.98	-5.26	-2.43	3.09	0.05	-0.04	3.46
1,097.00	0.40	197.55	1,096.98	-5.66	-2.66	3.31	0.24	0.12	-34.92
1,129.00	0.26	75.91	1,128.98	-5.75	-2.62	3.40	1.81	-0.44	-380.13
1,177.00	0.75	35.30	1,176.98	-5.47	-2.33	3.32	1.20	1.02	-84.60
1,224.00	2.68	15.89	1,223.95	-4.16	-1.86	2.48	4.23	4.11	-41.30
1,271.00	3.48	8.50	1,270.88	-1.69	-1.34	0.69	1.70	1.70	-15.72
1,318.00	3.89	345.21	1,317.79	1.18	-1.52	-1.82	1.45	1.45	-49.55
1,365.00	4.09	339.49	1,364.69	4.21	-2.49	-4.89	0.85	0.85	-12.17
1,412.00	4.17	333.08	1,411.56	7.30	-3.85	-8.23	1.00	1.00	-13.64
1,458.00	4.48	333.78	1,457.43	10.41	-5.40	-11.67	0.67	0.67	1.52
1,505.00	4.79	331.40	1,504.28	13.78	-7.15	-15.45	0.66	0.66	-5.06
1,553.00	5.67	334.40	1,552.08	17.67	-9.14	-19.80	1.92	1.83	6.25
1,647.00	7.21	338.61	1,645.48	27.36	-13.30	-30.19	1.71	1.64	4.48
1,741.00	8.92	335.71	1,738.55	39.49	-18.45	-43.17	1.87	1.82	-3.09
1,835.00	11.03	334.22	1,831.13	54.23	-25.36	-59.30	2.26	2.24	-1.59
1,930.00	12.04	332.73	1,924.21	71.22	-33.85	-78.18	1.11	1.06	-1.57
2,024.00	13.45	331.32	2,015.89	89.53	-43.59	-98.84	1.54	1.50	-1.50
2,119.00	16.57	334.40	2,107.64	111.45	-54.75	-123.30	3.39	3.28	3.24
2,212.00	18.46	334.57	2,196.32	136.70	-66.80	-151.05	2.03	2.03	0.18
2,305.00	20.52	333.96	2,283.99	164.65	-80.28	-181.84	2.23	2.22	-0.66
2,399.00	22.06	332.90	2,371.57	195.17	-95.55	-215.76	1.69	1.64	-1.13
2,494.00	21.27	332.81	2,459.86	226.38	-111.55	-250.65	0.83	-0.83	-0.09
2,588.00	23.11	335.27	2,546.89	258.30	-127.06	-285.88	2.19	1.96	2.62
2,681.00	25.88	337.03	2,631.52	293.57	-142.62	-323.94	3.08	2.98	1.89
2,776.00	27.33	335.89	2,716.46	332.57	-159.62	-365.91	1.62	1.53	-1.20
2,863.00	28.74	334.31	2,793.25	369.65	-176.85	-406.40	1.83	1.62	-1.82
2,971.00	27.77	332.64	2,888.38	415.40	-199.67	-457.20	1.16	-0.90	-1.55
3,065.00	28.96	332.37	2,971.09	455.01	-220.29	-501.66	1.27	1.27	-0.29
3,159.00	29.84	332.90	3,052.99	495.99	-241.50	-547.58	0.98	0.94	0.56
3,253.00	30.32	334.66	3,134.33	538.26	-262.31	-594.37	1.07	0.51	1.87
3,348.00	29.79	336.77	3,216.56	581.61	-281.88	-641.40	1.24	-0.56	2.22

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
3,442.00	30.01	336.68	3,298.04	624.66	-300.39	-687.60	0.24	0.23	-0.10
3,537.00	29.40	333.09	3,380.57	667.27	-320.35	-734.21	1.98	-0.64	-3.78
3,631.00	30.27	334.75	3,462.11	709.28	-340.90	-780.64	1.28	0.93	1.77
3,725.00	30.54	338.88	3,543.19	752.99	-359.62	-827.50	2.24	0.29	4.39
3,819.00	30.59	336.15	3,624.13	797.14	-377.89	-874.50	1.48	0.05	-2.90
3,913.00	30.23	332.55	3,705.21	840.02	-398.47	-921.68	1.98	-0.38	-3.83
4,007.00	28.83	336.77	3,787.00	881.85	-418.33	-967.58	2.67	-1.49	4.49
4,101.00	28.56	334.75	3,869.46	923.00	-436.85	-1,012.19	1.07	-0.29	-2.15
4,193.00	29.66	338.70	3,949.85	964.11	-454.50	-1,056.28	2.41	1.20	4.29
4,287.00	29.40	336.42	4,031.64	1,006.93	-472.18	-1,101.83	1.23	-0.28	-2.43
4,381.00	28.78	334.58	4,113.78	1,048.51	-491.12	-1,147.03	1.16	-0.66	-1.96
4,476.00	29.66	338.00	4,196.70	1,090.96	-509.75	-1,192.79	1.99	0.93	3.60
4,570.00	29.44	337.30	4,278.47	1,133.84	-527.37	-1,238.36	0.44	-0.23	-0.74
4,664.00	28.39	335.98	4,360.75	1,175.56	-545.39	-1,283.17	1.31	-1.12	-1.40
4,759.00	29.88	335.36	4,443.73	1,217.70	-564.45	-1,328.90	1.60	1.57	-0.65
4,852.00	29.31	334.75	4,524.60	1,259.35	-583.82	-1,374.39	0.69	-0.61	-0.66
4,947.00	29.97	335.98	4,607.17	1,302.06	-603.39	-1,420.87	0.94	0.69	1.29
5,041.00	29.27	334.75	4,688.88	1,344.29	-622.75	-1,466.84	0.99	-0.74	-1.31
5,135.00	30.89	335.10	4,770.22	1,386.96	-642.72	-1,513.51	1.73	1.72	0.37
5,230.00	30.19	334.22	4,852.04	1,430.59	-663.37	-1,561.36	0.87	-0.74	-0.93
5,324.00	29.31	337.03	4,933.66	1,473.06	-682.63	-1,607.48	1.75	0.94	2.99
5,419.00	30.94	337.47	5,015.82	1,517.03	-701.07	-1,654.40	1.73	0.94	0.46
5,513.00	29.93	337.21	5,096.87	1,560.97	-719.41	-1,701.26	1.08	-1.07	-0.28
5,607.00	28.96	335.63	5,178.73	1,603.32	-737.88	-1,746.85	1.92	1.93	-1.68
5,701.00	29.97	333.96	5,260.57	1,645.15	-757.58	-1,792.66	1.92	1.93	-1.78
5,796.00	30.81	332.90	5,342.52	1,688.12	-779.08	-1,840.42	1.05	0.88	-1.12
5,810.00	30.55	332.81	5,354.56	1,694.48	-782.34	-1,847.53	1.89	-3.14	-0.64
5,904.00	27.60	333.34	5,436.70	1,735.20	-803.03	-1,892.95	3.15	-3.14	0.56
5,998.00	28.62	334.48	5,519.61	1,774.98	-822.50	-1,936.92	1.23	1.09	1.21
6,045.00	28.84	333.52	5,560.83	1,795.28	-832.41	-1,959.35	1.09	0.47	-2.04
6,092.00	25.67	332.81	5,602.61	1,814.49	-842.11	-1,980.75	6.78	-6.74	-1.51
6,139.00	22.07	332.55	5,645.58	1,831.38	-850.84	-1,999.67	7.66	-7.66	-0.55
6,187.00	18.64	333.25	5,690.57	1,846.24	-858.45	-2,016.28	7.16	-7.15	1.46
6,234.00	16.18	334.04	5,735.42	1,858.84	-864.70	-2,030.25	5.26	-5.23	1.68
6,281.00	11.82	332.99	5,781.01	1,869.02	-869.75	-2,041.54	9.29	-9.28	-2.23
6,328.00	7.96	330.70	5,827.30	1,876.15	-873.53	-2,049.58	8.25	-8.21	-4.87
6,375.00	5.14	327.54	5,873.99	1,880.76	-876.26	-2,054.94	6.05	-6.00	-6.72
6,422.00	2.07	341.95	5,920.89	1,883.35	-877.65	-2,057.86	6.76	-6.53	30.66
6,469.00	2.68	77.93	5,967.87	1,884.39	-876.84	-2,058.29	7.56	1.30	204.21
6,516.00	6.42	125.65	6,014.73	1,883.08	-873.63	-2,055.45	10.69	7.96	101.53
6,562.00	10.33	128.20	6,060.23	1,879.03	-868.29	-2,049.16	8.54	8.50	5.54
6,609.00	13.89	131.37	6,106.17	1,872.70	-860.75	-2,039.73	7.70	7.57	6.74
6,657.00	17.85	134.44	6,152.34	1,863.73	-851.17	-2,027.00	8.43	8.25	6.40

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
6,704.00	21.98	135.23	6,196.52	1,852.44	-839.82	-2,011.36	8.81	8.79	1.68	
6,752.00	26.02	136.82	6,240.36	1,838.38	-826.29	-1,992.20	8.52	8.42	3.31	
6,799.00	30.73	139.72	6,281.70	1,821.69	-811.46	-1,970.13	10.44	10.02	6.17	
6,846.00	35.12	142.27	6,321.14	1,801.83	-795.42	-1,944.74	9.79	9.34	5.43	
6,893.00	38.73	145.17	6,358.71	1,779.06	-778.74	-1,916.56	8.53	7.68	6.17	
6,941.00	42.15	146.40	6,395.24	1,753.31	-761.24	-1,885.44	7.32	7.13	2.56	
6,988.00	46.81	148.15	6,428.77	1,725.60	-743.46	-1,852.52	10.25	9.91	3.72	
7,035.00	52.00	149.56	6,459.34	1,695.06	-725.03	-1,816.86	11.27	11.04	3.00	
7,082.00	58.33	149.91	6,486.17	1,661.76	-705.60	-1,778.34	13.48	13.47	0.74	
7,129.00	63.65	149.56	6,508.96	1,626.27	-684.89	-1,737.30	11.34	11.32	-0.74	
7,176.00	65.80	149.91	6,529.03	1,589.56	-663.47	-1,694.85	4.62	4.57	0.74	
7,224.00	68.18	149.56	6,547.79	1,551.41	-641.20	-1,650.72	5.00	4.96	-0.73	
7,271.00	72.70	150.09	6,563.52	1,513.13	-618.95	-1,606.49	9.68	9.62	1.13	
7,319.00	75.21	149.74	6,576.78	1,473.22	-595.83	-1,560.42	5.28	5.23	-0.73	
7,366.00	78.42	149.74	6,587.50	1,433.70	-572.77	-1,514.72	6.83	6.83	0.00	
7,414.00	78.86	149.91	6,596.96	1,393.01	-549.12	-1,467.71	0.98	0.92	0.35	
7,461.00	81.05	149.56	6,605.15	1,353.05	-525.79	-1,421.49	4.72	4.65	-0.74	
7,508.00	84.13	150.26	6,611.22	1,312.72	-502.43	-1,374.94	6.72	6.55	1.49	
7,555.00	84.79	150.62	6,615.75	1,272.03	-479.35	-1,328.24	2.96	2.81	0.77	
7,602.00	84.66	150.35	6,620.07	1,231.30	-456.29	-1,281.53	2.96	-0.26	-0.57	
7,649.00	85.98	149.91	6,623.91	1,190.69	-432.97	-1,234.75	3.45	2.81	-0.94	
7,696.00	87.60	149.82	6,626.54	1,150.10	-409.41	-1,187.88	3.45	2.81	-0.19	
7,743.00	88.00	149.21	6,628.34	1,109.63	-385.58	-1,140.96	1.55	0.85	-1.30	
7,790.00	87.69	149.03	6,630.11	1,069.32	-361.48	-1,094.02	0.76	-0.66	-0.38	
7,884.00	89.01	149.30	6,632.82	988.64	-313.32	-1,000.13	1.43	1.40	0.29	
7,978.00	88.70	149.65	6,634.70	907.69	-265.58	-906.23	0.50	-0.33	0.37	
8,072.00	89.49	149.21	6,636.18	826.76	-217.78	-812.32	0.96	0.84	-0.47	
8,167.00	88.70	149.39	6,637.68	745.09	-169.29	-717.40	0.85	-0.83	0.19	
8,261.00	90.68	149.65	6,638.19	664.08	-121.61	-623.50	2.12	2.11	0.28	
8,355.00	89.98	149.82	6,637.65	582.90	-74.23	-529.60	0.77	-0.74	0.18	
8,449.00	90.95	148.95	6,636.89	502.00	-26.36	-435.68	1.39	1.03	-0.93	
8,543.00	90.15	149.03	6,635.98	421.44	22.06	-341.74	0.86	-0.85	0.09	
8,637.00	89.45	148.77	6,636.31	340.96	70.61	-247.79	0.79	-0.74	-0.28	
8,731.00	89.93	149.03	6,636.82	260.47	119.17	-153.84	0.58	0.51	0.28	
8,825.00	89.23	148.95	6,637.51	179.91	167.59	-59.90	0.75	-0.74	-0.09	
8,919.00	89.41	151.06	6,638.63	98.51	214.58	33.97	2.25	0.19	2.24	
9,013.00	88.84	150.35	6,640.06	16.54	260.57	127.77	0.97	-0.61	-0.76	
9,108.00	89.58	151.06	6,641.37	-66.30	307.05	222.57	1.08	0.78	0.75	
9,202.00	88.92	151.06	6,642.60	-148.56	352.53	316.33	0.70	-0.70	0.00	
9,296.00	90.02	150.53	6,643.47	-230.60	398.39	410.13	1.30	1.17	-0.56	
9,390.00	89.80	150.97	6,643.62	-312.62	444.32	503.93	0.52	-0.23	0.47	
9,484.00	89.45	150.35	6,644.23	-394.56	490.38	597.75	0.76	-0.37	-0.66	
9,578.00	90.68	150.26	6,644.13	-476.21	536.95	691.59	1.31	1.31	-0.10	

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,672.00	90.42	150.18	6,643.22	-557.79	583.63	785.45	0.29	-0.28	-0.09
9,767.00	89.80	149.21	6,643.04	-639.81	631.57	880.35	1.21	-0.65	-1.02
9,861.00	89.80	149.47	6,643.37	-720.67	679.50	974.27	0.28	0.00	0.28
9,954.00	89.10	148.42	6,644.26	-800.34	727.47	1,067.22	1.36	-0.75	-1.13
10,048.00	89.01	149.56	6,645.81	-880.89	775.89	1,161.15	1.22	-0.10	1.21
10,142.00	88.00	148.86	6,648.27	-961.61	823.99	1,255.05	1.31	-1.07	-0.74
10,236.00	89.32	149.82	6,650.46	-1,042.45	871.91	1,348.95	1.74	1.40	1.02
10,330.00	88.79	149.82	6,652.01	-1,123.69	919.16	1,442.82	0.56	-0.56	0.00
10,424.00	89.63	150.88	6,653.31	-1,205.37	965.66	1,536.66	1.44	0.89	1.13
10,519.00	88.84	150.62	6,654.58	-1,288.25	1,012.07	1,631.45	0.88	-0.83	-0.27
10,613.00	90.59	151.76	6,655.05	-1,370.61	1,057.37	1,725.21	2.22	1.86	1.21
10,707.00	90.46	151.41	6,654.19	-1,453.28	1,102.10	1,818.91	0.40	-0.14	-0.37
10,801.00	89.67	151.67	6,654.08	-1,535.92	1,146.89	1,912.62	0.88	-0.84	0.28
10,894.00	88.97	152.29	6,655.18	-1,618.02	1,190.58	2,005.27	1.01	-0.75	0.67
10,989.00	90.24	151.23	6,655.84	-1,701.70	1,235.53	2,099.95	1.74	1.34	-1.12
11,083.00	89.54	150.53	6,656.02	-1,783.82	1,281.27	2,193.74	1.05	-0.74	-0.74
11,177.00	88.88	150.26	6,657.31	-1,865.54	1,327.70	2,287.57	0.76	-0.70	-0.29
11,270.00	87.60	150.00	6,660.17	-1,946.15	1,374.00	2,380.39	1.40	-1.38	-0.28
11,364.00	89.01	149.56	6,662.95	-2,027.33	1,421.29	2,474.25	1.57	1.50	-0.47
11,458.00	90.11	149.74	6,663.67	-2,108.45	1,468.78	2,568.15	1.19	1.17	0.19
11,552.00	89.71	149.65	6,663.82	-2,189.60	1,516.21	2,662.05	0.44	-0.43	-0.10
11,646.00	90.42	148.86	6,663.71	-2,270.39	1,564.27	2,755.98	1.13	-0.97	-0.84
11,740.00	89.93	148.51	6,663.43	-2,350.70	1,613.12	2,849.94	0.64	-0.97	-0.37
11,835.00	89.01	148.86	6,664.30	-2,431.85	1,662.50	2,944.90	1.04	-0.97	0.37
11,929.00	90.15	149.21	6,664.99	-2,512.45	1,710.86	3,038.84	1.21	-0.41	0.37
12,024.00	89.76	149.47	6,665.07	-2,594.17	1,759.30	3,133.76	0.94	-0.41	0.27
12,118.00	90.15	150.26	6,665.14	-2,675.47	1,806.49	3,227.65	0.87	-0.41	0.84
12,212.00	89.41	149.91	6,665.50	-2,756.94	1,853.37	3,321.52	0.87	-0.41	-0.37
12,306.00	89.93	150.35	6,666.04	-2,838.45	1,900.19	3,415.38	0.72	0.55	0.47
12,400.00	89.14	149.56	6,666.81	-2,919.82	1,947.25	3,509.26	1.19	-0.84	-0.84
12,494.00	90.42	150.26	6,667.17	-3,001.15	1,994.37	3,603.14	1.55	1.36	0.74
12,588.00	90.20	150.26	6,666.66	-3,082.77	2,041.00	3,696.99	0.23	-0.23	0.00
12,682.00	88.97	149.47	6,667.34	-3,164.06	2,088.19	3,790.88	1.56	-1.31	-0.84
12,776.00	90.42	150.35	6,667.84	-3,245.38	2,135.32	3,884.76	1.80	1.54	0.94
12,870.00	89.98	150.26	6,667.51	-3,327.04	2,181.88	3,978.60	0.48	-0.47	-0.10
12,965.00	91.12	150.00	6,666.60	-3,409.41	2,229.19	4,073.46	1.23	1.20	-0.27
13,058.00	90.77	150.18	6,665.07	-3,490.02	2,275.56	4,166.32	0.42	-0.38	0.19
13,153.00	90.46	150.09	6,664.05	-3,572.40	2,322.86	4,261.18	0.34	-0.33	-0.09
13,247.00	90.37	149.65	6,663.37	-3,653.69	2,370.05	4,355.06	0.48	-0.10	-0.47
13,347.00	88.70	147.72	6,664.18	-3,739.12	2,422.02	4,455.01	2.55	-1.67	-1.93
Survey @ 13347.00 MD 6664.18 TVD									
13,405.00	88.70	147.72	6,665.49	-3,788.14	2,452.98	4,512.99	0.00	0.00	0.00
Survey Proj. to 13405.00 MD 6665.49 TVD									

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
163.00	163.00	-0.82	0.34	MWD surveys
13,347.00	6,664.18	-3,739.12	2,422.02	Survey @ 13347.00 MD 6664.18 TVD
13,405.00	6,665.49	-3,788.14	2,452.98	Survey Proj. to 13405.00 MD 6665.49 TVD

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Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

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

Site	Whistlepig				
Site Position:		Northing:	14,444,965.96 usft	Latitude:	39.77526165
From:	Lat/Long	Easting:	1,698,572.65 usft	Longitude:	-80.79301490
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.132 °

Well	Whistlepig S-08HM (slot E)					
Well Position	+N/-S	0.00 ft	Northing:	14,444,994.44 usft	Latitude:	39.77533961
	+E/-W	0.00 ft	Easting:	1,698,611.27 usft	Longitude:	-80.79287721
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,368.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	5/14/2021	-8.602	66.550	51,758.97779459

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	147.07	

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Survey Program	Date	6/1/2021			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
163.00	1,097.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,129.00	2,863.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,971.00	13,347.00	MWD (Original Hole)	MWD	MWD - Standard	
13,405.00	13,405.00	Projection (Original Hole)	MWD	MWD - Standard	

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	14,444,994.44	1,698,611.27	39.77533961	-80.79287721
163.00	0.62	157.60	163.00	-0.82	0.34	14,444,993.62	1,698,611.60	39.77533737	-80.79287602
MWD surveys									
194.00	0.62	186.30	194.00	-1.14	0.38	14,444,993.30	1,698,611.65	39.77533649	-80.79287586
241.00	0.43	213.37	240.99	-1.54	0.26	14,444,992.90	1,698,611.52	39.77533539	-80.79287631
284.00	0.35	196.93	283.99	-1.80	0.13	14,444,992.64	1,698,611.40	39.77533467	-80.79287676
331.00	0.40	210.29	330.99	-2.08	0.01	14,444,992.36	1,698,611.27	39.77533391	-80.79287721
374.00	0.40	208.10	373.99	-2.34	-0.14	14,444,992.10	1,698,611.13	39.77533319	-80.79287773
421.00	0.40	205.02	420.99	-2.63	-0.29	14,444,991.80	1,698,610.98	39.77533239	-80.79287826



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
465.00	0.31	221.02	464.99	-2.86	-0.43	14,444,991.58	1,698,610.84	39.77533176	-80.79287877
512.00	0.35	210.20	511.99	-3.08	-0.59	14,444,991.36	1,698,610.68	39.77533115	-80.79287932
556.00	0.48	226.38	555.99	-3.32	-0.79	14,444,991.11	1,698,610.48	39.77533049	-80.79288004
603.00	0.44	225.24	602.98	-3.59	-1.06	14,444,990.85	1,698,610.21	39.77532977	-80.79288101
646.00	0.26	238.42	645.98	-3.75	-1.26	14,444,990.68	1,698,610.01	39.77532931	-80.79288172
693.00	0.22	215.13	692.98	-3.88	-1.40	14,444,990.55	1,698,609.87	39.77532895	-80.79288223
738.00	0.31	211.96	737.98	-4.06	-1.52	14,444,990.38	1,698,609.75	39.77532848	-80.79288264
772.00	0.31	195.88	771.98	-4.22	-1.59	14,444,990.21	1,698,609.68	39.77532802	-80.79288290
832.00	0.35	228.14	831.98	-4.50	-1.77	14,444,989.93	1,698,609.50	39.77532726	-80.79288355
879.00	0.22	210.82	878.98	-4.68	-1.92	14,444,989.76	1,698,609.34	39.77532678	-80.79288410
926.00	0.35	221.19	925.98	-4.86	-2.06	14,444,989.58	1,698,609.20	39.77532627	-80.79288460
1,020.00	0.31	224.44	1,019.98	-5.26	-2.43	14,444,989.18	1,698,608.84	39.77532518	-80.79288591
1,097.00	0.40	197.55	1,096.98	-5.66	-2.66	14,444,988.77	1,698,608.61	39.77532407	-80.79288672
1,129.00	0.26	75.91	1,128.98	-5.75	-2.62	14,444,988.68	1,698,608.65	39.77532383	-80.79288659
1,177.00	0.75	35.30	1,176.98	-5.47	-2.33	14,444,988.97	1,698,608.93	39.77532460	-80.79288556
1,224.00	2.68	15.89	1,223.95	-4.16	-1.86	14,444,990.27	1,698,609.41	39.77532819	-80.79288385
1,271.00	3.48	8.50	1,270.88	-1.69	-1.34	14,444,992.74	1,698,609.92	39.77533497	-80.79288201
1,318.00	3.69	345.21	1,317.79	1.18	-1.52	14,444,995.62	1,698,609.75	39.77534286	-80.79288261
1,365.00	4.09	339.49	1,364.69	4.21	-2.49	14,444,998.65	1,698,608.77	39.77535119	-80.79288605
1,412.00	4.17	333.08	1,411.56	7.30	-3.85	14,445,001.74	1,698,607.41	39.77535970	-80.79289087
1,458.00	4.48	333.78	1,457.43	10.41	-5.40	14,445,004.84	1,698,605.86	39.77536823	-80.79289636
1,505.00	4.79	331.40	1,504.28	13.78	-7.15	14,445,008.21	1,698,604.11	39.77537749	-80.79290256
1,553.00	5.67	334.40	1,552.08	17.67	-9.14	14,445,012.11	1,698,602.13	39.77538821	-80.79290959
1,647.00	7.21	338.61	1,645.48	27.36	-13.30	14,445,021.79	1,698,597.97	39.77544182	-80.79292431
1,741.00	8.92	335.71	1,738.55	39.49	-18.45	14,445,033.93	1,698,592.82	39.77544818	-80.79294254
1,835.00	11.03	334.22	1,831.13	54.23	-25.36	14,445,048.67	1,698,585.91	39.77548871	-80.79296701
1,930.00	12.04	332.73	1,924.21	71.22	-33.85	14,445,065.66	1,698,577.42	39.77553543	-80.79299710
2,024.00	13.45	331.32	2,015.89	89.53	-43.59	14,445,083.97	1,698,567.68	39.77558576	-80.79303161
2,119.00	16.57	334.40	2,107.64	111.45	-54.75	14,445,105.88	1,698,556.52	39.77564602	-80.79307114
2,212.00	18.46	334.57	2,196.32	136.70	-66.80	14,445,131.14	1,698,544.47	39.77571546	-80.79311383
2,305.00	20.52	333.96	2,283.99	164.65	-80.28	14,445,159.09	1,698,530.99	39.77579229	-80.79316158
2,399.00	22.06	332.90	2,371.57	195.17	-95.55	14,445,189.60	1,698,515.71	39.77587620	-80.79321569
2,494.00	21.27	332.81	2,459.86	226.38	-111.55	14,445,220.81	1,698,499.71	39.77596201	-80.79327239
2,588.00	23.11	335.27	2,546.89	258.30	-127.06	14,445,252.74	1,698,484.20	39.77604979	-80.79332733
2,681.00	25.88	337.03	2,631.52	293.57	-142.62	14,445,288.01	1,698,468.64	39.77614675	-80.79338241
2,776.00	27.33	335.89	2,716.46	332.57	-159.62	14,445,327.01	1,698,451.64	39.77625396	-80.79344260
2,863.00	28.74	334.31	2,793.25	369.65	-176.85	14,445,364.09	1,698,434.42	39.77635590	-80.79350361
2,971.00	27.77	332.64	2,888.38	415.40	-199.67	14,445,409.83	1,698,411.60	39.77648167	-80.79358445
3,065.00	28.96	332.37	2,971.09	455.01	-220.29	14,445,449.45	1,698,390.98	39.77659059	-80.79365751
3,159.00	29.84	332.90	3,052.99	495.99	-241.50	14,445,490.43	1,698,369.77	39.77670327	-80.79373266
3,253.00	30.32	334.66	3,134.33	538.26	-262.31	14,445,532.69	1,698,348.96	39.77681947	-80.79380638
3,348.00	29.79	336.77	3,216.56	581.61	-281.88	14,445,576.05	1,698,329.39	39.77693867	-80.79387568
3,442.00	30.01	336.68	3,298.04	624.66	-300.39	14,445,619.10	1,698,310.87	39.77705700	-80.79394123
3,537.00	29.40	333.09	3,380.57	667.27	-320.35	14,445,661.71	1,698,290.91	39.77717416	-80.79401192
3,631.00	30.27	334.75	3,462.11	709.28	-340.90	14,445,703.71	1,698,270.36	39.77728964	-80.79408472
3,725.00	30.54	338.88	3,543.19	752.99	-359.62	14,445,747.42	1,698,251.65	39.77740980	-80.79415097
3,819.00	30.59	336.15	3,624.13	797.14	-377.89	14,445,791.58	1,698,233.37	39.77753118	-80.79421566
3,913.00	30.23	332.55	3,705.21	840.02	-398.47	14,445,834.46	1,698,212.79	39.77764907	-80.79428856
4,007.00	28.83	336.77	3,787.00	881.85	-418.33	14,445,876.29	1,698,192.94	39.77776407	-80.79435887
4,101.00	28.56	334.75	3,869.46	923.00	-438.85	14,445,917.44	1,698,174.42	39.77787720	-80.79442447
4,193.00	29.66	338.70	3,949.85	964.11	-454.50	14,445,958.54	1,698,156.77	39.77799020	-80.79448696
4,287.00	29.40	336.42	4,031.64	1,006.93	-472.18	14,446,001.36	1,698,139.09	39.77810789	-80.79454953
4,381.00	28.78	334.58	4,113.78	1,048.51	-491.12	14,446,042.94	1,698,120.14	39.77822221	-80.79461662
4,476.00	29.66	338.00	4,196.70	1,090.96	-509.75	14,446,085.40	1,698,101.52	39.77833892	-80.79468256
4,570.00	29.44	337.30	4,278.47	1,133.84	-527.37	14,446,128.27	1,698,083.89	39.77845678	-80.79474495

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

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Survey									WV Department of Environmental Protection	
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,664.00	28.39	335.98	4,360.75	1,175.56	-545.39	14,446,170.00	1,698,065.88	39.77857148	-80.79480872	
4,759.00	29.88	335.36	4,443.73	1,217.70	-564.45	14,446,212.14	1,698,046.82	39.77886733	-80.79487621	
4,852.00	29.31	334.75	4,524.60	1,259.35	-583.82	14,446,253.78	1,698,027.45	39.77880182	-80.79494481	
4,947.00	29.97	335.98	4,607.17	1,302.06	-603.39	14,446,296.49	1,698,007.87	39.77891923	-80.79501415	
5,041.00	29.27	334.75	4,688.88	1,344.29	-622.75	14,446,338.72	1,697,988.51	39.77903532	-80.79508271	
5,135.00	30.89	335.10	4,770.22	1,386.96	-642.72	14,446,381.39	1,697,968.55	39.77915264	-80.79515342	
5,230.00	30.19	334.22	4,852.04	1,430.59	-663.37	14,446,425.02	1,697,947.90	39.77927259	-80.79522659	
5,324.00	29.31	337.03	4,933.66	1,473.06	-682.63	14,446,467.49	1,697,928.64	39.77938934	-80.79529479	
5,419.00	30.94	337.47	5,015.82	1,517.03	-701.07	14,446,511.46	1,697,910.20	39.77951021	-80.79536004	
5,513.00	29.93	337.21	5,096.87	1,560.97	-719.41	14,446,555.40	1,697,891.86	39.77963100	-80.79542498	
5,607.00	28.96	335.63	5,178.73	1,603.32	-737.88	14,446,597.75	1,697,873.39	39.77974742	-80.79549039	
5,701.00	29.97	333.96	5,260.57	1,645.15	-757.58	14,446,639.58	1,697,853.69	39.77986258	-80.79556016	
5,796.00	30.81	332.90	5,342.52	1,688.12	-779.08	14,446,682.56	1,697,832.19	39.77998062	-80.79563634	
5,810.00	30.55	332.81	5,354.56	1,694.48	-782.34	14,446,688.91	1,697,828.93	39.77998062	-80.79564789	
5,904.00	27.60	333.34	5,436.70	1,735.20	-803.03	14,446,729.63	1,697,808.24	39.78011001	-80.79572120	
5,998.00	28.62	334.48	5,519.61	1,774.98	-822.50	14,446,769.41	1,697,788.77	39.78021938	-80.79579018	
6,045.00	28.84	333.52	5,560.83	1,795.28	-832.41	14,446,789.72	1,697,778.86	39.78027520	-80.79582527	
6,092.00	25.67	332.81	5,602.61	1,814.49	-842.11	14,446,808.92	1,697,769.15	39.78032801	-80.79585967	
6,139.00	22.07	332.55	5,645.58	1,831.38	-850.84	14,446,825.82	1,697,760.43	39.78037446	-80.79589059	
6,187.00	18.64	333.25	5,690.57	1,846.24	-858.45	14,446,840.67	1,697,752.82	39.78041531	-80.79591756	
6,234.00	16.18	334.04	5,735.42	1,858.84	-864.70	14,446,853.27	1,697,746.57	39.78044995	-80.79593970	
6,281.00	11.82	332.99	5,781.01	1,869.02	-869.75	14,446,863.45	1,697,741.51	39.78047794	-80.79595761	
6,328.00	7.96	330.70	5,827.30	1,876.15	-873.53	14,446,870.58	1,697,737.73	39.78049754	-80.79597101	
6,375.00	5.14	327.54	5,873.99	1,880.76	-876.26	14,446,875.20	1,697,735.01	39.78051023	-80.79598066	
6,422.00	2.07	341.95	5,920.89	1,883.35	-877.65	14,446,877.78	1,697,733.62	39.78051734	-80.79598560	
6,469.00	2.68	77.93	5,967.87	1,884.39	-876.84	14,446,878.82	1,697,734.43	39.78052018	-80.79598270	
6,516.00	6.42	125.65	6,014.73	1,883.08	-873.63	14,446,877.52	1,697,737.64	39.78051658	-80.79597128	
6,562.00	10.33	128.20	6,060.23	1,879.03	-868.29	14,446,873.47	1,697,742.97	39.78050543	-80.79595233	
6,609.00	13.89	131.37	6,106.17	1,872.70	-860.75	14,446,867.13	1,697,750.52	39.78048798	-80.79592552	
6,657.00	17.85	134.44	6,152.34	1,863.73	-851.17	14,446,858.17	1,697,760.10	39.78046330	-80.79589149	
6,704.00	21.98	135.23	6,196.52	1,852.44	-839.82	14,446,846.87	1,697,771.44	39.78043222	-80.79585121	
6,752.00	26.02	136.82	6,240.36	1,838.38	-826.29	14,446,832.81	1,697,784.98	39.78039352	-80.79580314	
6,799.00	30.73	139.72	6,281.70	1,821.69	-811.46	14,446,816.12	1,697,799.81	39.78034760	-80.79575050	
6,846.00	35.12	142.27	6,321.14	1,801.83	-795.42	14,446,796.26	1,697,815.85	39.78029294	-80.79569355	
6,893.00	38.73	145.17	6,358.71	1,779.06	-778.74	14,446,773.49	1,697,832.53	39.78023030	-80.79563438	
6,941.00	42.15	146.40	6,395.24	1,753.31	-761.24	14,446,747.74	1,697,850.02	39.78015948	-80.79557232	
6,988.00	46.81	148.15	6,428.77	1,725.60	-743.46	14,446,720.04	1,697,867.80	39.78008328	-80.79550926	
7,035.00	52.00	149.56	6,459.34	1,695.06	-725.03	14,446,689.49	1,697,886.24	39.77999929	-80.79544389	
7,082.00	58.33	149.91	6,486.17	1,661.76	-705.60	14,446,656.19	1,697,905.67	39.77990771	-80.79537500	
7,129.00	63.65	149.56	6,508.96	1,626.27	-684.89	14,446,620.70	1,697,926.38	39.77981012	-80.79530157	
7,176.00	65.80	149.91	6,529.03	1,589.56	-663.47	14,446,584.00	1,697,947.80	39.77970918	-80.79522564	
7,224.00	68.18	149.56	6,547.79	1,551.41	-641.20	14,446,545.84	1,697,970.07	39.77960425	-80.79514669	
7,271.00	72.70	150.09	6,563.52	1,513.13	-618.95	14,446,507.56	1,697,992.32	39.77949899	-80.79506780	
7,319.00	75.21	149.74	6,576.78	1,473.22	-595.83	14,446,467.65	1,698,015.44	39.77938924	-80.79498582	
7,366.00	78.42	149.74	6,587.50	1,433.70	-572.77	14,446,428.13	1,698,038.50	39.77928056	-80.79490408	
7,414.00	78.86	149.91	6,596.96	1,393.01	-549.12	14,446,387.45	1,698,062.15	39.77916868	-80.79482022	
7,461.00	81.05	149.56	6,605.15	1,353.05	-525.79	14,446,347.48	1,698,085.48	39.77905877	-80.79473753	
7,508.00	84.13	150.26	6,611.22	1,312.72	-502.43	14,446,307.16	1,698,108.84	39.77894789	-80.79465470	
7,555.00	84.79	150.62	6,615.75	1,272.03	-479.35	14,446,266.47	1,698,131.92	39.77883599	-80.79457289	
7,602.00	84.66	150.35	6,620.07	1,231.30	-456.29	14,446,225.74	1,698,154.97	39.77872400	-80.79449116	
7,649.00	85.98	149.91	6,623.91	1,190.69	-432.97	14,446,185.12	1,698,178.30	39.77861230	-80.79440845	
7,696.00	87.60	149.82	6,626.54	1,150.10	-409.41	14,446,144.54	1,698,201.86	39.77850070	-80.79432494	
7,743.00	88.00	149.21	6,628.34	1,109.63	-385.58	14,446,104.06	1,698,225.69	39.77838940	-80.79424046	
7,790.00	87.69	149.03	6,630.11	1,069.32	-361.48	14,446,063.76	1,698,249.79	39.77827855	-80.79415500	
7,884.00	89.01	149.30	6,632.82	988.64	-313.32	14,445,983.08	1,698,297.95	39.77805668	-80.79398424	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
7,978.00	88.70	149.65	6,634.70	907.69	-265.58	14,445,902.12	1,698,345.69	39.77783406	-80.79381501
8,072.00	89.49	149.21	6,636.18	826.76	-217.78	14,445,821.20	1,698,393.49	39.77761151	-80.79364554
8,167.00	88.70	149.39	6,637.68	745.09	-169.29	14,445,739.52	1,698,441.98	39.77738690	-80.79347360
8,261.00	90.68	149.65	6,638.19	664.08	-121.61	14,445,658.52	1,698,489.66	39.77716414	-80.79330457
8,355.00	89.98	149.82	6,637.65	582.90	-74.23	14,445,577.33	1,698,537.03	39.77694088	-80.79313662
8,449.00	90.95	148.95	6,636.89	502.00	-26.36	14,445,496.44	1,698,584.90	39.77671842	-80.79296692
8,543.00	90.15	149.03	6,635.98	421.44	22.06	14,445,415.88	1,698,633.33	39.77649687	-80.79279523
8,637.00	89.45	148.77	6,636.31	340.96	70.61	14,445,335.39	1,698,681.88	39.77627552	-80.79262308
8,731.00	89.93	149.03	6,636.82	260.47	119.17	14,445,254.90	1,698,730.43	39.77605417	-80.79245093
8,825.00	89.23	148.95	6,637.51	179.91	167.59	14,445,174.34	1,698,778.86	39.77583262	-80.79227924
8,919.00	89.41	151.06	6,638.63	98.51	214.58	14,445,092.94	1,698,825.85	39.77560877	-80.79211268
9,013.00	88.84	150.35	6,640.06	16.54	260.57	14,445,010.97	1,698,871.84	39.77538337	-80.79194968
9,108.00	89.58	151.06	6,641.37	-66.30	307.05	14,444,928.13	1,698,918.31	39.77515557	-80.79178494
9,202.00	88.92	151.06	6,642.60	-148.56	352.53	14,444,845.88	1,698,963.80	39.77492938	-80.79162375
9,296.00	90.02	150.53	6,643.47	-230.60	398.39	14,444,763.83	1,699,009.66	39.77470377	-80.79146120
9,390.00	89.80	150.97	6,643.62	-312.62	444.32	14,444,681.82	1,699,055.59	39.77447824	-80.79129841
9,484.00	89.45	150.35	6,644.23	-394.56	490.38	14,444,599.88	1,699,101.65	39.77425271	-80.79113517
9,578.00	90.68	150.26	6,644.13	-476.21	536.95	14,444,518.23	1,699,148.21	39.77402718	-80.79097012
9,672.00	90.42	150.18	6,643.22	-557.79	583.63	14,444,436.64	1,699,194.90	39.77380165	-80.79080464
9,767.00	89.80	149.21	6,643.04	-639.81	631.57	14,444,354.63	1,699,242.83	39.77357612	-80.79063472
9,861.00	89.80	149.47	6,643.37	-720.67	679.50	14,444,273.77	1,699,290.77	39.77335059	-80.79046479
9,954.00	89.10	148.42	6,644.26	-800.34	727.47	14,444,194.10	1,699,338.74	39.77312506	-80.79029472
10,048.00	89.01	149.56	6,645.81	-880.89	775.89	14,444,113.55	1,699,387.16	39.77290000	-80.79012307
10,142.00	88.00	148.86	6,648.27	-961.61	823.99	14,444,032.83	1,699,435.26	39.77267494	-80.78995255
10,236.00	89.32	149.82	6,650.46	-1,042.45	871.91	14,443,951.99	1,699,483.18	39.77244988	-80.78978268
10,330.00	88.79	149.82	6,652.01	-1,123.69	919.16	14,443,870.75	1,699,530.43	39.77222476	-80.78961280
10,424.00	89.63	150.88	6,653.31	-1,205.37	965.66	14,443,789.06	1,699,576.92	39.77200000	-80.78944292
10,519.00	88.84	150.62	6,654.58	-1,288.25	1,012.07	14,443,706.19	1,699,623.34	39.77177527	-80.78927304
10,613.00	90.59	151.76	6,655.05	-1,370.61	1,057.37	14,443,623.83	1,699,668.63	39.77155054	-80.78910316
10,707.00	90.46	151.41	6,654.19	-1,453.28	1,102.10	14,443,541.15	1,699,713.36	39.77132581	-80.78893328
10,801.00	89.67	151.67	6,654.08	-1,535.92	1,146.89	14,443,458.52	1,699,758.16	39.77110114	-80.78876340
10,894.00	88.97	152.29	6,655.18	-1,618.02	1,190.58	14,443,376.42	1,699,801.84	39.77087647	-80.78859352
10,989.00	90.24	151.23	6,655.84	-1,701.70	1,235.53	14,443,292.74	1,699,846.79	39.77065180	-80.78842364
11,083.00	89.54	150.53	6,656.02	-1,783.82	1,281.27	14,443,210.62	1,699,892.53	39.77042713	-80.78825376
11,177.00	88.88	150.26	6,657.31	-1,865.54	1,327.70	14,443,128.90	1,699,938.97	39.77020246	-80.78808388
11,270.00	87.60	150.00	6,660.17	-1,946.15	1,374.00	14,443,048.29	1,699,985.26	39.77000000	-80.78791400
11,364.00	89.01	149.56	6,662.95	-2,027.33	1,421.29	14,442,967.11	1,700,032.55	39.76977533	-80.78774412
11,458.00	90.11	149.74	6,663.67	-2,108.45	1,468.78	14,442,885.99	1,700,080.05	39.76955060	-80.78757424
11,552.00	89.71	149.65	6,663.82	-2,189.60	1,516.21	14,442,804.84	1,700,127.48	39.76932587	-80.78740436
11,646.00	90.42	148.86	6,663.71	-2,270.39	1,564.27	14,442,724.05	1,700,175.53	39.76910114	-80.78723448
11,740.00	89.93	148.51	6,663.43	-2,350.70	1,613.12	14,442,643.74	1,700,224.39	39.76887641	-80.78706460
11,835.00	89.01	148.86	6,664.30	-2,431.85	1,662.50	14,442,562.59	1,700,273.76	39.76865168	-80.78689472
11,929.00	90.15	149.21	6,664.99	-2,512.45	1,710.86	14,442,481.99	1,700,322.12	39.76842700	-80.78672484
12,024.00	89.76	149.47	6,665.07	-2,594.17	1,759.30	14,442,400.27	1,700,370.57	39.76820233	-80.78655496
12,118.00	90.15	150.26	6,665.14	-2,675.47	1,806.49	14,442,318.98	1,700,417.76	39.76797760	-80.78638508
12,212.00	89.41	149.91	6,665.50	-2,756.94	1,853.37	14,442,237.50	1,700,464.64	39.76775287	-80.78621520
12,306.00	89.93	150.35	6,666.04	-2,838.45	1,900.19	14,442,155.99	1,700,511.45	39.76752814	-80.78604532
12,400.00	89.14	149.56	6,666.81	-2,919.82	1,947.25	14,442,074.62	1,700,558.51	39.76730341	-80.78587544
12,494.00	90.42	150.26	6,667.17	-3,001.15	1,994.37	14,441,993.30	1,700,605.64	39.76707868	-80.78570556
12,588.00	90.20	150.26	6,666.66	-3,082.77	2,041.00	14,441,911.68	1,700,652.27	39.76685395	-80.78553568
12,682.00	88.97	149.47	6,667.34	-3,164.06	2,088.19	14,441,830.39	1,700,699.46	39.76662922	-80.78536580
12,776.00	90.42	150.35	6,667.84	-3,245.38	2,135.32	14,441,749.06	1,700,746.58	39.76640449	-80.78519592
12,870.00	89.98	150.26	6,667.51	-3,327.04	2,181.88	14,441,667.40	1,700,793.15	39.76617976	-80.78502604
12,965.00	91.12	150.00	6,666.60	-3,409.41	2,229.19	14,441,585.03	1,700,840.46	39.76595503	-80.78485616
13,058.00	90.77	150.18	6,665.07	-3,490.02	2,275.56	14,441,504.43	1,700,886.82	39.76573030	-80.78468628

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 WV Department of Environmental Protection
 10/21/2022

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-08HM (slot E)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-08HM (slot E)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,153.00	90.46	150.09	6,664.05	-3,572.40	2,322.86	14,441,422.05	1,700,934.13	39.76551377	-80.78464045
13,247.00	90.37	149.65	6,663.37	-3,653.69	2,370.05	14,441,340.75	1,700,981.31	39.76529020	-80.78447324
13,347.00	88.70	147.72	6,664.18	-3,739.12	2,422.02	14,441,255.33	1,701,033.28	39.76505526	-80.78428904
Survey @ 13347.00 MD 6664.18 TVD									
13,405.00	88.70	147.72	6,665.49	-3,788.14	2,452.98	14,441,206.31	1,701,064.25	39.76492042	-80.78417926
Survey Proj. to 13405.00 MD 6665.49 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
163.00	163.00	-0.82	0.34	MWD surveys
13,347.00	6,664.18	-3,739.12	2,422.02	Survey @ 13347.00 MD 6664.18 TVD
13,405.00	6,665.49	-3,788.14	2,452.98	Survey Proj. to 13405.00 MD 6665.49 TVD

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