



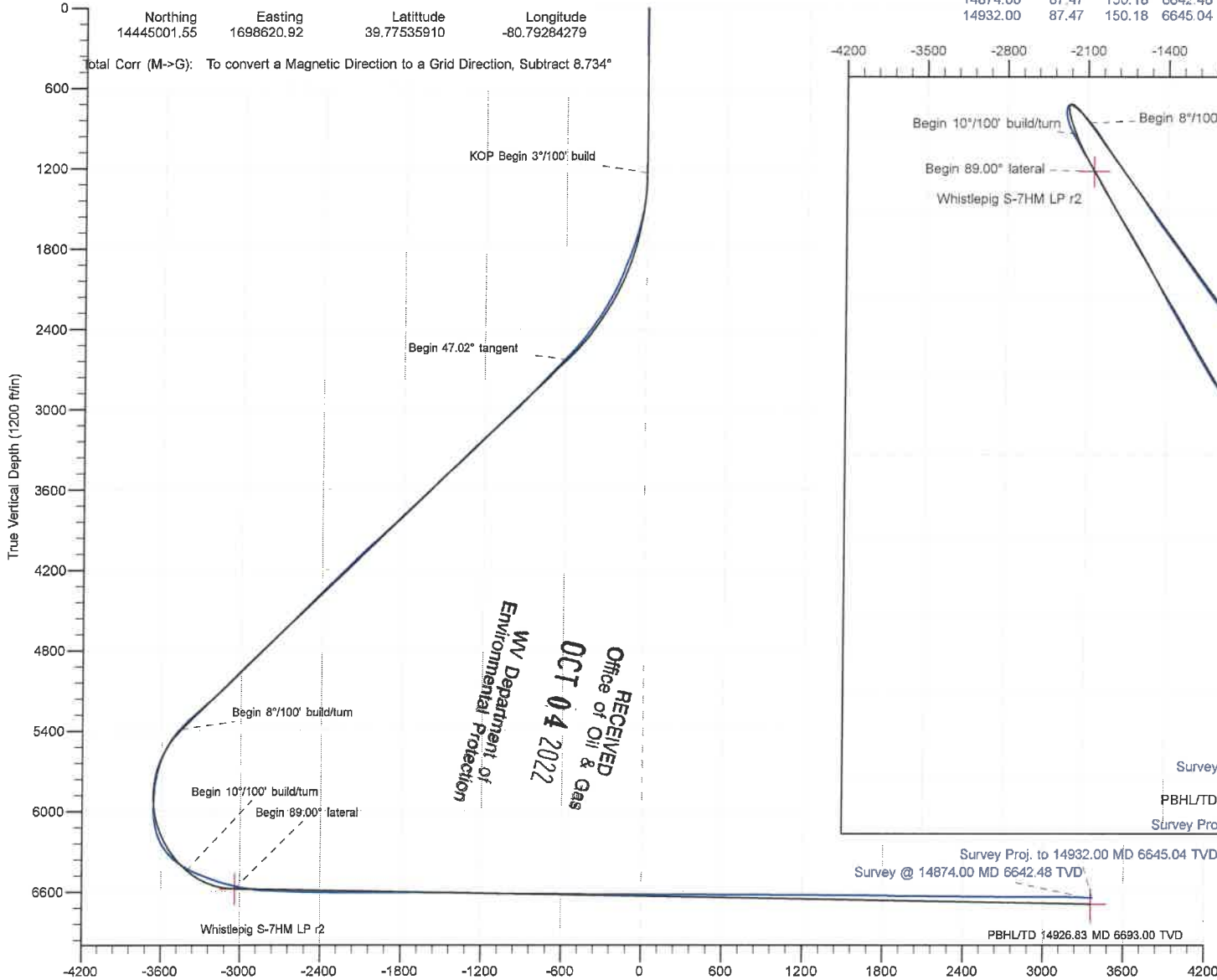
Well: Whistlepig S-07HM (slot F)
 Site: Whistlepig
 Project: Marshall County, West Virginia
 Design: rev2
 Rig: Nabors X14

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

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

Northing 14445001.55 Easting 1698620.92 Latitude 39.77535910 Longitude -80.79284279

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.734°



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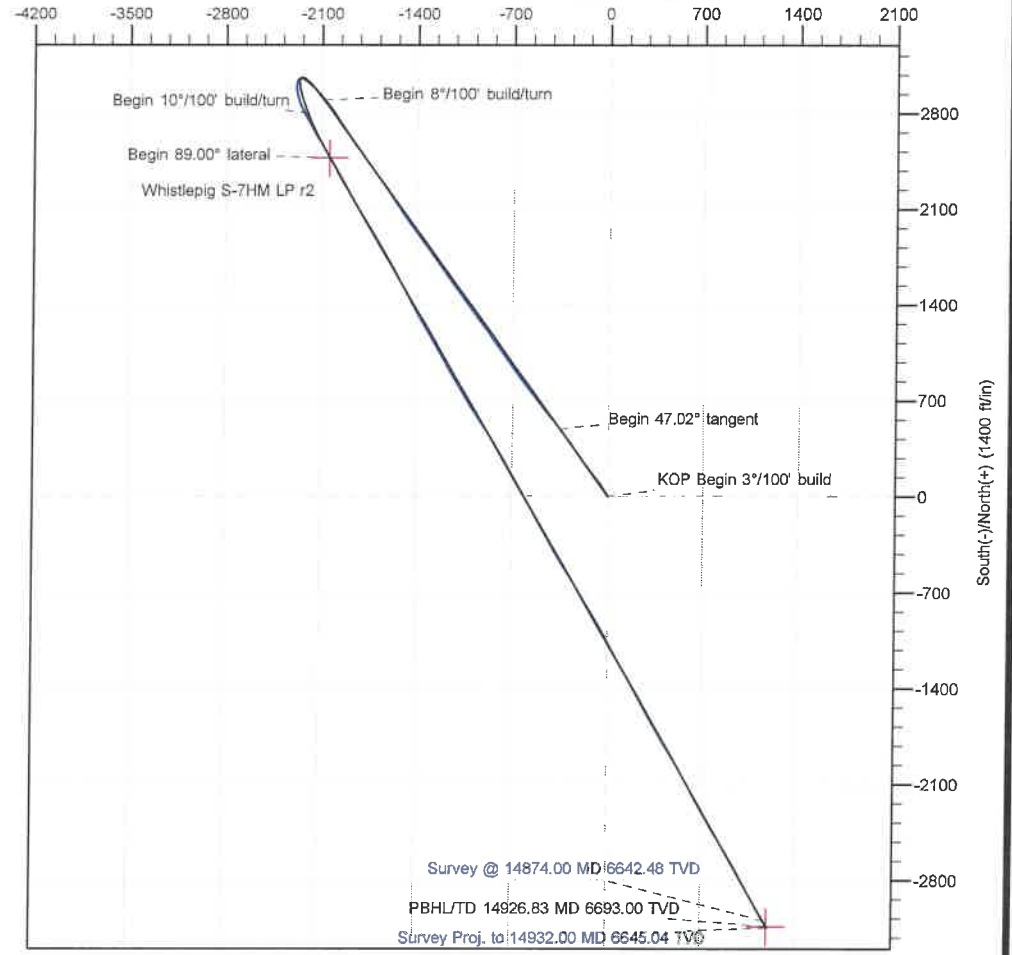
SECTION DETAILS

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	1233.50	0.00	0.00	1233.50	0.00	0.00	0.00	0.000	0.00	KOP Begin 3°/100' build
3	2800.95	47.02	324.24	2630.82	493.32	-355.23	3.00	324.243	-587.59	Begin 47.02° tangent
4	6847.58	47.02	324.24	5389.40	2895.90	-2085.27	0.00	0.000	-3449.27	Begin 8°/100' build/turn
5	8047.72	50.00	158.62	6443.13	2800.75	-2203.23	8.00	-168.974	-3402.45	Begin 10°/100' build/turn
6	8445.55	89.00	150.00	6580.00	2473.37	-2041.69	10.00	-13.546	-3038.99	Begin 89.00° lateral
7	14926.83	89.00	150.00	6693.00	-3138.67	1198.56	0.00	0.000	3359.73	PBHL/TD 14926.83 MD 6693.00 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	V Sect	Annotation
179.00	0.13	49.19	179.00	0.13	0.15	-0.07	MWD surveys
14874.00	87.47	150.18	6642.48	-3096.41	1175.76	3312.12	Survey @ 14874.00 MD 6642.48 TVD
14932.00	87.47	150.18	6645.04	-3146.68	1204.57	3369.36	Survey Proj. to 14932.00 MD 6645.04 TVD

West(-)/East(+), (1400 ft/m)



Azimuths to Grid North
 True North: -0.13°
 Magnetic North: -8.73°

Magnetic Field
 Strength: 51768.1nT
 Dip Angle: 66.56°
 Date: 4/13/2021
 Model: IGRF2020



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	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-07HM (slot F)					
Well Position	+N/-S	0.00 ft	Northing:	14,445,001.56 usft	Latitude:	39.77535910
	+E/-W	0.00 ft	Easting:	1,698,620.92 usft	Longitude:	-80.79284279
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 (nT)
	IGRF2020	4/13/2021	-8.602	66.559	51,768.10473766

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	159.10	

Survey Program	Date 5/15/2021				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
179.00	1,089.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,164.00	3,015.00	MWD int (Original Hole)	MWD	MWD - Standard	
3,079.00	14,874.00	MWD (Original Hole)	MWD	MWD - Standard	
14,932.00	14,932.00	Projection (Original Hole)	MWD	MWD - Standard	

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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	
179.00	0.13	49.19	179.00	0.13	0.15	-0.07	0.07	0.07	0.00	
MWD surveys										
226.00	0.13	81.09	226.00	0.18	0.25	-0.08	0.15	0.00	67.87	
270.00	0.04	86.89	270.00	0.18	0.31	-0.06	0.21	-0.20	13.18	
317.00	0.13	189.73	317.00	0.13	0.32	-0.01	0.31	0.19	218.81	
360.00	0.04	229.98	360.00	0.07	0.30	0.04	0.24	-0.21	93.60	

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Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-07HM (slot F)	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)
407.00	0.13	302.32	407.00	0.09	0.24	0.00	0.26	0.19	153.91
450.00	0.04	112.47	450.00	0.11	0.21	-0.03	0.39	-0.21	395.70
497.00	0.09	95.07	497.00	0.10	0.27	0.00	0.11	0.11	-37.02
541.00	0.04	192.54	541.00	0.09	0.30	0.03	0.23	-0.11	221.52
588.00	0.04	149.83	588.00	0.06	0.30	0.06	0.06	0.00	-90.87
632.00	0.13	88.74	632.00	0.04	0.36	0.09	0.26	0.20	-138.84
679.00	0.09	299.50	679.00	0.06	0.38	0.08	0.45	-0.09	-317.53
723.00	0.13	214.69	723.00	0.04	0.32	0.08	0.34	0.09	-192.75
770.00	0.08	135.67	770.00	-0.03	0.31	0.14	0.30	-0.11	-168.13
818.00	0.09	1.38	818.00	-0.01	0.34	0.13	0.33	0.02	-279.77
865.00	0.09	118.36	865.00	0.00	0.37	0.13	0.33	0.00	248.89
913.00	0.04	232.09	913.00	-0.02	0.39	0.16	0.23	-0.10	236.94
960.00	0.13	150.70	960.00	-0.08	0.41	0.22	0.28	0.19	-173.17
1,008.00	0.13	81.27	1,008.00	-0.12	0.49	0.29	0.31	0.00	-144.65
1,049.00	0.17	110.80	1,049.00	-0.13	0.59	0.34	0.21	0.10	72.02
1,089.00	0.22	104.39	1,089.00	-0.17	0.72	0.42	0.14	0.13	-16.03
1,164.00	0.18	129.96	1,164.00	-0.29	0.95	0.61	0.13	-0.05	34.09
1,258.00	0.75	357.77	1,258.00	0.23	1.04	0.15	0.94	0.61	-140.63
1,289.00	1.49	348.37	1,288.99	0.83	0.95	-0.44	2.45	2.39	-30.32
1,321.00	2.63	343.10	1,320.97	1.94	0.65	-1.58	3.61	3.56	-16.47
1,352.00	3.30	336.94	1,351.93	3.44	0.09	-3.18	2.39	2.16	-19.87
1,383.00	4.83	335.10	1,382.85	5.45	-0.80	-5.38	4.95	4.94	-5.94
1,415.00	6.33	333.34	1,414.70	8.25	-2.16	-8.48	4.72	4.69	-5.50
1,446.00	7.43	330.18	1,445.47	11.51	-3.93	-12.16	3.75	3.55	-10.19
1,493.00	9.27	329.30	1,491.97	17.41	-7.37	-18.89	3.92	3.91	-1.87
1,540.00	11.69	328.51	1,538.18	24.72	-11.79	-27.30	5.16	5.15	-1.68
1,587.00	13.84	327.98	1,584.02	33.55	-17.26	-37.50	4.58	4.57	-1.13
1,634.00	15.25	327.54	1,629.51	43.53	-23.56	-49.07	3.01	3.00	-0.94
1,681.00	16.30	326.84	1,674.74	54.27	-30.48	-61.57	2.27	2.23	-1.49
1,729.00	17.53	326.31	1,720.66	65.92	-38.18	-75.21	2.58	2.56	-1.10
1,776.00	19.29	325.78	1,765.26	78.23	-46.47	-89.66	3.76	3.74	-1.13
1,822.00	20.74	325.43	1,808.48	91.22	-55.37	-104.97	2.89	3.15	-0.76
1,869.00	22.06	324.55	1,852.24	105.27	-65.21	-121.60	2.89	2.81	-1.87
1,917.00	22.32	323.23	1,896.68	119.91	-75.89	-139.09	2.89	0.54	-2.75
1,964.00	22.41	321.74	1,940.15	134.09	-86.78	-156.24	1.22	0.19	-3.17
2,012.00	22.76	321.30	1,984.47	148.52	-98.25	-173.80	2.77	0.73	-0.92
2,059.00	24.04	321.92	2,027.60	163.16	-109.84	-191.61	2.77	2.72	1.32
2,106.00	26.15	322.09	2,070.16	178.87	-122.11	-210.66	4.49	4.49	0.36
2,153.00	28.00	322.27	2,112.01	195.76	-135.23	-231.12	3.94	3.94	0.38
2,199.00	28.65	322.44	2,152.50	213.05	-148.56	-252.02	1.42	1.41	0.37
2,246.00	29.84	323.06	2,193.51	231.32	-162.45	-274.06	2.61	2.53	1.32
2,292.00	31.11	323.50	2,233.15	250.02	-176.40	-296.50	2.80	2.76	0.96
2,339.00	33.18	324.29	2,272.95	270.23	-191.13	-320.63	4.49	4.40	1.68
2,387.00	35.02	324.82	2,312.69	292.15	-206.73	-346.68	3.88	3.83	1.10

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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)
2,434.00	36.47	324.90	2,350.84	314.61	-222.54	-373.29	3.09	3.09	0.17
2,481.00	36.78	324.02	2,388.56	337.42	-238.84	-400.42	1.30	0.66	-1.87
2,528.00	37.27	325.96	2,426.08	360.60	-255.07	-427.87	2.70	1.04	4.13
2,576.00	38.45	322.44	2,463.98	384.48	-272.30	-456.32	5.13	2.46	-7.33
2,623.00	40.39	322.18	2,500.29	408.09	-290.55	-484.89	4.14	4.13	-0.55
2,670.00	42.93	322.62	2,535.40	432.85	-309.61	-514.82	5.44	5.40	0.94
2,765.00	45.70	323.50	2,603.37	485.89	-349.48	-578.59	2.99	2.92	0.93
2,859.00	46.05	322.79	2,668.81	539.88	-389.95	-643.47	0.66	0.37	-0.76
2,953.00	45.35	322.53	2,734.46	593.37	-430.76	-707.99	0.77	-0.74	-0.28
3,015.00	44.74	321.74	2,778.27	628.01	-457.68	-749.96	1.33	-0.98	-1.27
3,079.00	44.13	321.21	2,823.97	663.06	-485.59	-792.66	1.12	-0.95	-0.83
3,174.00	44.88	322.27	2,891.72	715.35	-526.82	-856.22	1.11	0.79	1.12
3,267.00	46.15	322.62	2,956.89	767.95	-567.26	-919.79	1.39	1.37	0.38
3,362.00	47.25	324.99	3,022.04	823.74	-608.07	-986.47	2.15	1.16	2.49
3,456.00	48.84	324.46	3,084.89	880.81	-648.45	-1,054.18	1.74	1.69	-0.56
3,547.00	47.96	322.79	3,145.31	935.60	-688.79	-1,119.76	1.68	-0.97	-1.84
3,642.00	46.51	324.55	3,209.81	991.77	-730.12	-1,186.98	2.04	-1.53	1.85
3,736.00	46.07	324.20	3,274.77	1,047.00	-769.70	-1,252.70	0.54	-0.47	-0.37
3,830.00	47.34	323.76	3,339.23	1,102.34	-809.93	-1,318.74	1.39	1.35	-0.47
3,925.00	47.96	324.99	3,403.22	1,159.41	-850.82	-1,386.64	1.16	0.65	1.29
4,019.00	47.91	325.96	3,466.20	1,216.90	-890.37	-1,454.46	0.77	-0.05	1.03
4,113.00	48.26	324.46	3,529.00	1,274.34	-930.28	-1,522.36	1.24	0.37	-1.60
4,207.00	47.12	322.88	3,592.28	1,330.34	-971.46	-1,589.37	1.74	-1.21	-1.68
4,301.00	47.08	323.58	3,656.26	1,385.50	-1,012.67	-1,655.60	0.55	-0.04	0.74
4,396.00	47.47	325.52	3,720.72	1,442.35	-1,053.14	-1,723.14	1.56	0.41	2.04
4,490.00	46.73	324.11	3,784.71	1,498.63	-1,092.82	-1,789.87	1.35	-0.79	-1.50
4,584.00	47.47	323.85	3,848.70	1,554.32	-1,133.31	-1,856.35	0.81	0.79	-0.28
4,679.00	48.13	324.81	3,912.51	1,611.49	-1,174.34	-1,924.40	1.02	0.69	1.01
4,773.00	48.00	325.08	3,975.33	1,668.73	-1,214.51	-1,992.20	0.28	-0.14	0.29
4,867.00	48.00	325.43	4,038.23	1,726.13	-1,254.32	-2,060.03	1.87	0.28	0.37
4,962.00	46.86	323.58	4,102.50	1,783.10	-1,294.93	-2,127.73	0.15	-1.20	-1.95
5,056.00	46.90	323.76	4,166.75	1,838.37	-1,335.58	-2,193.87	0.15	-0.56	0.19
5,151.00	46.37	325.34	4,231.98	1,894.63	-1,375.64	-2,260.71	1.03	-0.66	1.66
5,245.00	46.99	324.29	4,296.47	1,950.52	-1,415.04	-2,326.98	1.03	0.66	-1.12
5,340.00	45.32	323.67	4,362.28	2,005.93	-1,455.33	-2,393.12	1.82	1.09	-0.65
5,434.00	46.20	325.87	4,427.86	2,060.94	-1,494.16	-2,458.37	1.92	0.94	2.34
5,528.00	46.90	326.05	4,492.51	2,117.49	-1,532.36	-2,524.82	0.76	0.74	0.19
5,622.00	45.27	325.61	4,557.71	2,173.51	-1,570.39	-2,590.73	1.77	-1.73	-0.47
5,716.00	45.71	325.52	4,623.60	2,228.80	-1,608.30	-2,655.90	0.47	0.47	-0.10
5,810.00	46.73	323.76	4,688.64	2,284.14	-1,647.58	-2,721.61	1.73	1.09	-1.87
5,904.00	46.59	324.64	4,753.16	2,339.59	-1,687.57	-2,787.67	0.70	-0.15	0.94
5,999.00	46.86	325.34	4,818.28	2,396.24	-1,727.25	-2,854.75	0.61	0.28	0.74
6,092.00	46.55	325.52	4,882.06	2,451.98	-1,765.66	-2,920.52	0.36	-0.33	0.19

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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)
6,187.00	46.37	324.64	4,947.50	2,508.44	-1,805.08	-2,987.34	0.70	-0.19	-0.93
6,282.00	46.86	323.85	5,012.75	2,564.47	-1,845.42	-3,054.07	0.79	0.52	-0.83
6,376.00	47.38	325.08	5,076.72	2,620.52	-1,885.45	-3,120.71	1.11	0.55	1.31
6,469.00	48.13	325.17	5,139.24	2,677.00	-1,924.81	-3,187.52	0.81	0.81	0.10
6,563.00	49.67	326.92	5,201.04	2,735.76	-1,964.36	-3,256.52	2.16	1.64	1.86
6,657.00	50.55	325.87	5,261.32	2,795.82	-2,004.28	-3,326.88	1.27	0.94	-1.12
6,752.00	47.08	323.58	5,323.87	2,854.20	-2,045.53	-3,396.12	4.08	-3.65	-2.41
6,846.00	44.75	321.21	5,389.27	2,907.70	-2,086.70	-3,460.79	3.07	-2.48	-2.52
6,893.00	40.18	319.54	5,423.93	2,932.14	-2,106.92	-3,490.84	10.01	-9.72	-3.55
6,941.00	36.97	317.78	5,461.46	2,954.62	-2,126.67	-3,518.88	7.07	-6.69	-3.67
6,988.00	33.49	315.67	5,499.84	2,974.37	-2,145.23	-3,543.95	7.84	-7.40	-4.49
7,035.00	29.98	314.36	5,539.81	2,991.86	-2,162.70	-3,566.52	7.61	-7.47	-2.79
7,082.00	26.42	312.86	5,581.23	3,007.19	-2,178.76	-3,586.57	7.72	-7.57	-3.19
7,129.00	22.55	311.37	5,623.99	3,020.26	-2,193.20	-3,603.94	8.34	-8.23	-3.17
7,176.00	19.12	308.29	5,667.91	3,030.99	-2,206.00	-3,618.53	7.66	-7.30	-6.55
7,224.00	16.09	304.78	5,713.66	3,039.66	-2,217.64	-3,630.78	6.69	-6.31	-7.31
7,271.00	12.97	303.63	5,759.15	3,046.30	-2,227.38	-3,640.46	6.67	-6.64	-2.45
7,319.00	10.68	300.47	5,806.13	3,051.54	-2,235.70	-3,648.32	4.96	-4.77	-6.58
7,366.00	8.35	293.09	5,852.48	3,055.08	-2,242.60	-3,654.09	5.59	-4.96	-15.70
7,414.00	7.96	271.29	5,900.01	3,056.52	-2,249.13	-3,657.77	6.45	-0.81	-45.42
7,461.00	8.70	254.94	5,946.52	3,055.67	-2,255.82	-3,659.36	5.26	1.57	-34.79
7,508.00	9.71	240.18	5,992.92	3,052.78	-2,262.69	-3,659.11	5.44	2.15	-31.40
7,538.00	10.29	232.27	6,022.46	3,049.88	-2,267.00	-3,657.94	4.96	1.93	-26.37
7,602.00	12.75	212.75	6,085.19	3,040.44	-2,275.35	-3,652.09	7.15	3.84	-30.50
7,632.00	15.60	201.33	6,114.28	3,033.89	-2,278.61	-3,647.14	13.27	9.50	-38.07
7,664.00	19.08	192.54	6,144.83	3,024.78	-2,281.31	-3,639.59	13.58	10.88	-27.47
7,696.00	22.20	186.91	6,174.78	3,013.67	-2,283.17	-3,629.87	11.54	9.75	-17.59
7,727.00	25.63	181.90	6,203.11	3,001.15	-2,284.10	-3,618.51	12.85	11.06	-16.16
7,758.00	29.23	177.86	6,230.63	2,986.87	-2,284.04	-3,605.16	13.07	11.61	-13.03
7,790.00	32.92	175.23	6,258.03	2,970.40	-2,283.02	-3,589.40	12.28	11.53	-8.22
7,821.00	36.79	171.89	6,283.47	2,952.80	-2,281.01	-3,572.25	13.92	12.48	-10.77
7,853.00	39.87	167.23	6,308.57	2,933.30	-2,277.39	-3,552.74	13.16	12.63	-14.56
7,884.00	43.60	163.54	6,331.70	2,913.35	-2,272.17	-3,532.24	14.40	12.03	-11.90
7,915.00	47.25	162.31	6,353.46	2,892.25	-2,265.68	-3,510.21	12.11	11.27	-3.97
7,947.00	51.03	159.05	6,374.39	2,869.43	-2,257.65	-3,486.02	14.10	11.81	-10.19
7,978.00	54.64	155.45	6,393.12	2,846.66	-2,248.09	-3,461.34	11.65	11.65	-11.61
8,009.00	58.29	151.76	6,410.25	2,823.54	-2,236.59	-3,435.64	15.39	11.65	-11.90
8,041.00	62.73	150.70	6,426.00	2,799.13	-2,223.18	-3,408.05	14.17	13.88	-3.31
8,073.00	65.41	150.53	6,439.99	2,774.06	-2,209.06	-3,379.59	8.39	8.38	-0.53
8,104.00	66.64	150.26	6,452.58	2,749.43	-2,195.07	-3,351.59	4.05	3.97	-0.87
8,135.00	68.40	150.44	6,464.44	2,724.54	-2,180.90	-3,323.28	5.70	5.68	0.58
8,167.00	69.76	150.79	6,475.86	2,698.49	-2,166.23	-3,293.72	4.37	4.25	1.09
8,198.00	69.67	150.70	6,486.61	2,673.12	-2,152.02	-3,264.95	0.40	-0.29	-0.29

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	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)
8,230.00	69.45	150.88	6,497.78	2,646.95	-2,137.39	-3,235.28	0.87	-0.69	0.56
8,261.00	69.45	150.44	6,508.67	2,621.65	-2,123.17	-3,206.57	1.33	0.00	-1.42
8,308.00	71.30	150.88	6,524.45	2,583.06	-2,101.48	-3,162.78	4.03	3.94	0.94
8,355.00	74.86	150.97	6,538.13	2,543.76	-2,079.63	-3,118.28	7.58	7.57	0.19
8,402.00	76.00	151.14	6,549.95	2,503.96	-2,057.62	-3,073.24	2.45	2.43	0.36
8,449.00	77.54	151.49	6,560.71	2,463.82	-2,035.66	-3,027.91	3.36	3.28	0.74
8,496.00	79.43	151.23	6,570.09	2,423.40	-2,013.58	-2,982.28	4.06	4.02	-0.55
8,543.00	81.19	151.06	6,578.00	2,382.83	-1,991.22	-2,936.39	3.76	3.74	-0.36
8,590.00	82.59	150.53	6,584.63	2,342.21	-1,968.52	-2,890.35	3.18	2.98	-1.13
8,637.00	86.29	150.26	6,589.18	2,301.55	-1,945.42	-2,844.12	7.89	7.87	-0.57
8,731.00	88.44	149.39	6,593.50	2,220.38	-1,898.22	-2,751.46	2.47	2.29	-0.93
8,825.00	88.13	148.86	6,596.32	2,139.74	-1,850.00	-2,658.92	0.65	-0.33	-0.56
8,919.00	88.40	149.30	6,599.16	2,059.13	-1,801.73	-2,566.40	0.55	0.29	0.47
9,013.00	87.78	148.77	6,602.30	1,978.58	-1,753.39	-2,473.89	0.87	-0.66	-0.56
9,108.00	88.75	149.12	6,605.17	1,897.23	-1,704.40	-2,380.43	1.09	1.02	0.37
9,202.00	89.93	149.47	6,606.26	1,816.41	-1,656.41	-2,287.81	1.31	1.26	0.37
9,296.00	89.10	150.70	6,607.05	1,734.94	-1,609.53	-2,194.97	1.58	-0.88	1.31
9,390.00	89.85	152.29	6,607.91	1,652.35	-1,564.68	-2,101.81	1.87	0.80	1.69
9,484.00	91.03	152.11	6,607.19	1,569.20	-1,520.84	-2,008.49	1.27	1.26	-0.19
9,579.00	89.85	151.32	6,606.46	1,485.55	-1,475.83	-1,914.29	1.49	-1.24	-0.83
9,672.00	90.64	150.62	6,606.06	1,404.23	-1,430.70	-1,822.22	1.13	0.85	-0.75
9,767.00	90.07	150.53	6,605.47	1,321.49	-1,384.03	-1,728.28	0.61	-0.60	-0.09
9,861.00	89.19	150.35	6,606.08	1,239.73	-1,337.65	-1,635.35	0.96	-0.94	-0.19
9,954.00	89.89	150.44	6,606.83	1,158.87	-1,291.71	-1,543.43	0.76	0.75	0.10
10,048.00	89.27	150.18	6,607.52	1,077.21	-1,245.15	-1,450.53	0.72	-0.66	-0.28
10,142.00	88.53	150.44	6,609.32	995.57	-1,198.60	-1,357.65	0.83	-0.79	0.28
10,236.00	89.63	150.53	6,610.83	913.78	-1,152.30	-1,264.73	1.17	1.17	0.10
10,330.00	88.92	150.44	6,612.02	831.99	-1,106.00	-1,171.80	0.76	-0.76	-0.10
10,424.00	89.49	149.30	6,613.33	750.70	-1,058.82	-1,079.02	1.36	0.61	-1.21
10,519.00	88.88	148.24	6,614.68	669.47	-1,009.57	-985.58	1.29	-0.64	-1.12
10,613.00	89.41	147.45	6,616.08	589.90	-959.55	-893.39	1.01	0.56	-0.84
10,707.00	89.41	148.24	6,617.05	510.32	-909.52	-801.21	0.84	0.00	0.84
10,801.00	90.59	148.95	6,617.05	430.10	-860.54	-708.79	1.47	-0.37	0.76
10,895.00	90.24	148.15	6,616.37	349.91	-811.50	-616.38	0.92	-0.75	-0.85
10,989.00	89.58	149.74	6,616.51	269.38	-763.01	-523.85	1.83	-1.01	1.69
11,084.00	88.62	149.65	6,618.01	187.38	-715.08	-430.14	1.92	-1.01	-0.09
11,178.00	89.85	150.97	6,619.26	105.73	-668.53	-337.26	0.79	-0.76	1.40
11,271.00	89.14	151.14	6,620.08	24.35	-623.52	-245.18	1.28	-0.76	0.18
11,364.00	90.33	151.14	6,620.51	-57.10	-578.63	-153.08	1.28	1.28	0.00
11,459.00	89.41	151.06	6,620.73	-140.27	-532.72	-59.00	0.97	-0.97	-0.08
11,553.00	90.55	150.70	6,620.76	-222.38	-486.98	34.03	1.27	1.21	-0.38
11,647.00	89.76	150.53	6,620.50	-304.29	-440.85	127.00	0.86	-0.84	-0.18
11,741.00	90.95	150.26	6,619.92	-386.01	-394.42	219.91	1.30	1.27	-0.29
11,835.00	90.46	150.00	6,618.77	-467.52	-347.61	312.76	0.59	-0.52	-0.28

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	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)
11,930.00	89.49	149.39	6,618.81	-549.54	-299.67	406.48	1.21	-1.02	-0.64
12,025.00	89.63	148.42	6,619.54	-630.88	-250.61	499.97	1.03	0.15	-1.02
12,118.00	90.24	147.89	6,619.64	-709.88	-201.54	591.28	0.87	0.66	-0.57
12,213.00	89.85	147.89	6,619.57	-790.35	-151.04	684.47	0.41	-0.41	0.00
12,307.00	89.32	149.30	6,620.25	-870.58	-102.06	776.89	1.60	-0.56	1.50
12,401.00	89.36	151.32	6,621.33	-952.23	-55.51	869.77	2.15	0.04	2.15
12,495.00	88.48	151.23	6,623.10	-1,034.64	-10.34	962.88	0.94	-0.94	-0.10
12,589.00	89.80	150.88	6,624.51	-1,116.89	35.14	1,055.94	1.45	1.40	-0.37
12,683.00	89.14	150.70	6,625.38	-1,198.93	81.02	1,148.95	0.73	-0.70	-0.19
12,777.00	90.51	150.88	6,625.67	-1,280.98	126.89	1,241.96	1.47	1.46	0.19
12,871.00	89.93	150.70	6,625.31	-1,363.02	172.76	1,334.97	0.65	-0.62	-0.19
12,965.00	89.19	150.44	6,626.03	-1,444.89	218.95	1,427.93	0.83	-0.79	-0.28
13,059.00	90.02	150.35	6,626.68	-1,526.62	265.38	1,520.84	0.89	0.88	-0.10
13,153.00	88.97	150.35	6,627.51	-1,608.30	311.88	1,613.74	1.12	-1.12	0.00
13,248.00	90.24	149.56	6,628.16	-1,690.53	359.44	1,707.53	1.57	1.34	-0.83
13,342.00	89.27	149.74	6,628.57	-1,771.65	406.94	1,800.25	1.05	-1.03	0.19
13,437.00	88.57	149.56	6,630.36	-1,853.62	454.93	1,893.95	0.76	-0.74	-0.19
13,531.00	90.29	149.12	6,631.29	-1,934.47	502.86	1,986.58	1.89	1.83	-0.47
13,625.00	89.58	149.03	6,631.40	-2,015.10	551.17	2,079.14	0.76	-0.76	-0.10
13,721.00	90.07	150.88	6,631.69	-2,098.20	599.23	2,173.92	1.99	0.51	1.93
13,815.00	89.23	150.70	6,632.26	-2,180.25	645.10	2,266.93	0.91	-0.89	-0.19
13,910.00	88.18	150.18	6,634.41	-2,262.86	691.96	2,360.82	1.23	-1.11	-0.55
14,005.00	89.19	150.09	6,636.59	-2,345.22	739.25	2,454.63	1.07	1.06	-0.09
14,099.00	89.93	150.00	6,637.31	-2,426.66	786.19	2,547.46	0.79	0.79	-0.10
14,193.00	90.55	149.21	6,636.92	-2,507.74	833.74	2,640.17	1.07	0.66	-0.84
14,287.00	89.63	148.33	6,636.77	-2,588.11	882.48	2,732.64	1.35	-0.98	-0.94
14,381.00	89.76	148.59	6,637.27	-2,668.23	931.65	2,825.03	0.31	0.14	0.28
14,474.00	90.07	149.74	6,637.41	-2,748.08	979.32	2,916.63	1.28	0.33	1.24
14,568.00	90.42	151.58	6,637.01	-2,830.02	1,025.38	3,009.61	1.99	0.37	1.96
14,662.00	89.58	150.70	6,637.01	-2,912.34	1,070.75	3,102.70	1.29	-0.89	-0.94
14,756.00	88.62	150.18	6,638.49	-2,994.10	1,117.11	3,195.61	1.16	-1.02	-0.55
14,849.00	87.74	150.18	6,641.44	-3,074.74	1,163.34	3,287.44	0.95	-0.95	0.00
14,874.00	87.47	150.18	6,642.48	-3,096.41	1,175.76	3,312.12	1.08	-1.08	0.00
Survey @ 14874.00 MD 6642.48 TVD									
14,932.00	87.47	150.18	6,645.04	-3,146.68	1,204.57	3,369.36	0.00	0.00	0.00
Survey Proj. to 14932.00 MD 6645.04 TVD									

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	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)	
179.00	179.00	0.13	0.15	MWD surveys
14,874.00	6,642.48	-3,096.41	1,175.76	Survey @ 14874.00 MD 6642.48 TVD

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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-07HM (slot F)	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-07HM (slot F)					
Well Position	+N/-S	0.00 ft	Northing:	14,445,001.56 usft	Latitude:	39.77535910
	+E/-W	0.00 ft	Easting:	1,698,620.92 usft	Longitude:	-80.79284279
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	4/13/2021	-8.602	66.559	51,768.10473766

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	159.10	

Survey Program	Date 5/15/2021				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
179.00	1,089.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,164.00	3,015.00	MWD int (Original Hole)	MWD	MWD - Standard	
3,079.00	14,874.00	MWD (Original Hole)	MWD	MWD - Standard	
14,932.00	14,932.00	Projection (Original Hole)	MWD	MWD - Standard	

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Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,445,001.56	1,698,620.92	39.77535910	-80.79284279	
179.00	0.13	49.19	179.00	0.13	0.15	14,445,001.69	1,698,621.08	39.77535947	-80.79284224	
MWD surveys										
226.00	0.13	81.09	226.00	0.18	0.25	14,445,001.73	1,698,621.17	39.77535958	-80.79284191	
270.00	0.04	86.89	270.00	0.18	0.31	14,445,001.74	1,698,621.23	39.77535961	-80.79284168	
317.00	0.13	189.73	317.00	0.13	0.32	14,445,001.69	1,698,621.24	39.77535946	-80.79284166	
360.00	0.04	229.98	360.00	0.07	0.30	14,445,001.63	1,698,621.22	39.77535931	-80.79284173	
407.00	0.13	302.32	407.00	0.09	0.24	14,445,001.65	1,698,621.16	39.77535936	-80.79284193	
450.00	0.04	112.47	450.00	0.11	0.21	14,445,001.67	1,698,621.14	39.77535941	-80.79284203	

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Site:	Whistlepig	MD Reference:	RKB=1368+32.5 @ 1400.50ft (Nabors X14)
Well:	Whistlepig S-07HM (slot F)	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
497.00	0.09	95.07	497.00	0.10	0.27	14,445,001.66	1,698,621.19	39.77535938	-80.79284184
541.00	0.04	192.54	541.00	0.09	0.30	14,445,001.64	1,698,621.22	39.77535934	-80.79284173
588.00	0.04	149.83	588.00	0.06	0.30	14,445,001.61	1,698,621.22	39.77535925	-80.79284172
632.00	0.13	88.74	632.00	0.04	0.36	14,445,001.60	1,698,621.28	39.77535922	-80.79284151
679.00	0.09	299.50	679.00	0.06	0.38	14,445,001.62	1,698,621.30	39.77535927	-80.79284144
723.00	0.13	214.69	723.00	0.04	0.32	14,445,001.59	1,698,621.24	39.77535921	-80.79284164
770.00	0.08	135.67	770.00	-0.03	0.31	14,445,001.53	1,698,621.24	39.77535902	-80.79284167
818.00	0.09	1.38	818.00	-0.01	0.34	14,445,001.54	1,698,621.26	39.77535906	-80.79284158
865.00	0.09	118.36	865.00	0.00	0.37	14,445,001.56	1,698,621.29	39.77535911	-80.79284147
913.00	0.04	232.09	913.00	-0.02	0.39	14,445,001.53	1,698,621.31	39.77535903	-80.79284140
960.00	0.13	150.70	960.00	-0.08	0.41	14,445,001.48	1,698,621.33	39.77535888	-80.79284135
1,008.00	0.13	81.27	1,008.00	-0.12	0.49	14,445,001.44	1,698,621.41	39.77535877	-80.79284106
1,049.00	0.17	110.80	1,049.00	-0.13	0.59	14,445,001.42	1,698,621.51	39.77535873	-80.79284070
1,089.00	0.22	104.39	1,089.00	-0.17	0.72	14,445,001.38	1,698,621.64	39.77535862	-80.79284023
1,164.00	0.18	129.96	1,164.00	-0.29	0.95	14,445,001.27	1,698,621.87	39.77535831	-80.79283942
1,258.00	0.75	357.77	1,258.00	0.23	1.04	14,445,001.79	1,698,621.96	39.77535974	-80.79283910
1,289.00	1.49	348.37	1,288.99	0.83	0.95	14,445,002.39	1,698,621.87	39.77536138	-80.79283941
1,321.00	2.63	343.10	1,320.97	1.94	0.65	14,445,003.50	1,698,621.57	39.77536443	-80.79284046
1,352.00	3.30	336.94	1,351.93	3.44	0.09	14,445,005.00	1,698,621.02	39.77536856	-80.79284242
1,383.00	4.83	335.10	1,382.85	5.45	-0.80	14,445,007.00	1,698,620.12	39.77537407	-80.79284561
1,415.00	6.33	333.34	1,414.70	8.25	-2.16	14,445,009.80	1,698,618.76	39.77538176	-80.79285042
1,446.00	7.43	330.18	1,445.47	11.51	-3.93	14,445,013.07	1,698,616.99	39.77539074	-80.79285667
1,493.00	9.27	329.30	1,491.97	17.41	-7.37	14,445,018.96	1,698,613.55	39.77540695	-80.79286888
1,540.00	11.69	328.51	1,538.18	24.72	-11.79	14,445,026.28	1,698,609.13	39.77542707	-80.79288455
1,587.00	13.84	327.98	1,584.02	33.55	-17.26	14,445,035.11	1,698,603.66	39.77545135	-80.79290394
1,634.00	15.25	327.54	1,629.51	43.53	-23.56	14,445,045.09	1,698,597.36	39.77547880	-80.79292628
1,681.00	16.30	326.84	1,674.74	54.27	-30.48	14,445,055.82	1,698,590.44	39.77550833	-80.79295084
1,729.00	17.53	326.31	1,720.66	65.92	-38.18	14,445,067.48	1,698,582.74	39.77554039	-80.79297813
1,776.00	19.29	325.78	1,765.26	78.23	-46.47	14,445,079.79	1,698,574.45	39.77557425	-80.79300754
1,822.00	20.74	325.43	1,808.48	91.22	-55.37	14,445,092.78	1,698,565.56	39.77560998	-80.79303909
1,869.00	22.06	324.55	1,852.24	105.27	-65.21	14,445,106.82	1,698,555.71	39.77564861	-80.79307401
1,917.00	22.32	323.23	1,896.68	119.91	-75.89	14,445,121.47	1,698,545.03	39.77568999	-80.79311191
1,964.00	22.41	321.74	1,940.15	134.09	-86.78	14,445,135.65	1,698,534.14	39.77572791	-80.79315055
2,012.00	22.76	321.30	1,984.47	148.52	-98.25	14,445,150.08	1,698,522.67	39.77576762	-80.79319126
2,059.00	24.04	321.92	2,027.60	163.16	-109.84	14,445,164.71	1,698,511.08	39.77580787	-80.79323239
2,106.00	26.15	322.09	2,070.16	178.87	-122.11	14,445,180.42	1,698,498.81	39.77585109	-80.79327593
2,153.00	28.00	322.27	2,112.01	195.76	-135.23	14,445,197.32	1,698,485.69	39.77589751	-80.79332247
2,199.00	28.65	322.44	2,152.50	213.05	-148.56	14,445,214.60	1,698,472.36	39.77594513	-80.79336977
2,246.00	29.84	323.06	2,193.51	231.32	-162.45	14,445,232.88	1,698,458.47	39.77599541	-80.79341908
2,292.00	31.11	323.50	2,233.15	250.02	-176.40	14,445,251.58	1,698,444.52	39.77604686	-80.79346857
2,339.00	33.18	324.29	2,272.95	270.23	-191.13	14,445,271.79	1,698,429.79	39.77610244	-80.79352083
2,387.00	35.02	324.82	2,312.69	292.15	-206.73	14,445,293.71	1,698,414.19	39.77616275	-80.79357619
2,434.00	36.47	324.90	2,350.84	314.61	-222.54	14,445,316.16	1,698,398.38	39.77622451	-80.79363225
2,481.00	36.78	324.02	2,388.56	337.42	-238.84	14,445,338.98	1,698,382.09	39.77628727	-80.79369007
2,528.00	37.27	325.96	2,426.08	360.60	-255.07	14,445,362.16	1,698,365.85	39.77635103	-80.79374765
2,576.00	38.45	322.44	2,463.98	384.48	-272.30	14,445,386.03	1,698,348.62	39.77641671	-80.79380880
2,623.00	40.39	322.18	2,500.29	408.09	-290.55	14,445,409.65	1,698,330.37	39.77648168	-80.79387355
2,670.00	42.93	322.62	2,535.40	432.85	-309.61	14,445,434.40	1,698,311.31	39.77654978	-80.79394118
2,765.00	45.70	323.50	2,603.37	485.89	-349.48	14,445,487.45	1,698,271.44	39.77669571	-80.79408265
2,859.00	46.05	322.79	2,668.81	539.88	-389.95	14,445,541.44	1,698,230.97	39.77684423	-80.79422626
2,953.00	45.35	322.53	2,734.46	593.37	-430.76	14,445,594.92	1,698,190.17	39.77699138	-80.79437105
3,015.00	44.74	321.74	2,778.27	628.01	-457.68	14,445,629.56	1,698,163.24	39.77708668	-80.79446661
3,079.00	44.13	321.21	2,823.97	663.06	-485.59	14,445,664.61	1,698,135.33	39.77718312	-80.79456565
3,174.00	44.88	322.27	2,891.72	715.35	-526.82	14,445,716.90	1,698,094.10	39.77732698	-80.79471198
3,267.00	46.15	322.62	2,956.89	767.95	-567.26	14,445,769.50	1,698,053.66	39.77747169	-80.79485548

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Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	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
3,362.00	47.25	324.99	3,022.04	823.74	-608.07	14,445,825.30	1,698,012.85	39.77762517	-80.79500028
3,456.00	48.84	324.46	3,084.89	880.81	-648.45	14,445,882.36	1,697,972.48	39.77778214	-80.79514351
3,547.00	47.96	322.79	3,145.31	935.60	-688.79	14,445,937.15	1,697,932.13	39.77793286	-80.79528668
3,642.00	46.51	324.55	3,209.81	991.77	-730.12	14,445,993.33	1,697,890.80	39.77808739	-80.79543330
3,736.00	46.07	324.20	3,274.77	1,047.00	-769.70	14,446,048.56	1,697,851.23	39.77823932	-80.79557372
3,830.00	47.34	323.76	3,339.23	1,102.34	-809.93	14,446,103.89	1,697,810.99	39.77839153	-80.79571648
3,925.00	47.96	324.99	3,403.22	1,159.41	-850.82	14,446,160.96	1,697,770.10	39.77854852	-80.79586155
4,019.00	47.91	325.96	3,466.20	1,216.90	-890.37	14,446,218.45	1,697,730.55	39.77870665	-80.79600186
4,113.00	48.26	324.46	3,529.00	1,274.34	-930.28	14,446,275.89	1,697,690.64	39.77886465	-80.79614345
4,207.00	47.12	322.88	3,592.28	1,330.34	-971.46	14,446,331.90	1,697,649.47	39.77901871	-80.79628954
4,301.00	47.08	323.58	3,656.26	1,385.50	-1,012.67	14,446,387.05	1,697,608.25	39.77917044	-80.79643580
4,396.00	47.47	325.52	3,720.72	1,442.35	-1,053.14	14,446,443.90	1,697,567.78	39.77932682	-80.79657939
4,490.00	46.73	324.11	3,784.71	1,498.63	-1,092.82	14,446,500.18	1,697,528.11	39.77948162	-80.79672014
4,584.00	47.47	323.85	3,848.70	1,554.32	-1,133.31	14,446,555.87	1,697,487.61	39.77963482	-80.79686382
4,679.00	48.13	324.81	3,912.51	1,611.49	-1,174.34	14,446,613.05	1,697,446.58	39.77979209	-80.79700941
4,773.00	48.00	325.08	3,975.33	1,668.73	-1,214.51	14,446,670.29	1,697,406.42	39.77994954	-80.79715191
4,867.00	48.00	325.43	4,038.23	1,726.13	-1,254.32	14,446,727.69	1,697,366.60	39.78010743	-80.79729315
4,962.00	46.86	323.58	4,102.50	1,783.10	-1,294.93	14,446,784.65	1,697,325.99	39.78026411	-80.79743724
5,056.00	46.90	323.76	4,166.75	1,838.37	-1,335.58	14,446,839.92	1,697,285.35	39.78041617	-80.79758148
5,151.00	46.37	325.34	4,231.98	1,894.63	-1,375.64	14,446,896.18	1,697,245.29	39.78057091	-80.79772360
5,245.00	46.99	324.29	4,296.47	1,950.52	-1,415.04	14,446,952.07	1,697,205.88	39.78072464	-80.79786342
5,340.00	45.32	323.67	4,362.28	2,005.93	-1,455.33	14,447,007.49	1,697,165.59	39.78087708	-80.79800637
5,434.00	46.20	325.87	4,427.86	2,060.94	-1,494.16	14,447,062.49	1,697,126.76	39.78102839	-80.79814416
5,528.00	46.90	326.05	4,492.51	2,117.49	-1,532.36	14,447,119.04	1,697,088.56	39.78118392	-80.79827967
5,622.00	45.27	325.61	4,557.71	2,173.51	-1,570.39	14,447,175.07	1,697,050.53	39.78133802	-80.79841458
5,716.00	45.71	325.52	4,623.60	2,228.80	-1,608.30	14,447,230.35	1,697,012.63	39.78149008	-80.79854906
5,810.00	46.73	323.76	4,688.64	2,284.14	-1,647.58	14,447,285.69	1,696,973.35	39.78164230	-80.79868843
5,904.00	46.59	324.64	4,753.16	2,339.59	-1,687.57	14,447,341.14	1,696,933.36	39.78179482	-80.79883033
5,999.00	46.86	325.34	4,818.28	2,396.24	-1,727.25	14,447,397.79	1,696,893.68	39.78195065	-80.79897112
6,092.00	46.55	325.52	4,882.06	2,451.98	-1,765.66	14,447,453.53	1,696,855.27	39.78210395	-80.79910738
6,187.00	46.37	324.64	4,947.50	2,508.44	-1,805.08	14,447,509.99	1,696,815.85	39.78225926	-80.79924724
6,282.00	46.86	323.85	5,012.75	2,564.47	-1,845.42	14,447,566.02	1,696,775.51	39.78241338	-80.79939040
6,376.00	47.38	325.08	5,076.72	2,620.52	-1,885.45	14,447,622.07	1,696,735.48	39.78256756	-80.79953244
6,469.00	48.13	325.17	5,139.24	2,677.00	-1,924.81	14,447,678.55	1,696,696.11	39.78272174	-80.79967210
6,563.00	49.67	326.92	5,201.04	2,735.76	-1,964.36	14,447,737.31	1,696,656.56	39.78288452	-80.79981241
6,657.00	50.55	325.87	5,261.32	2,795.82	-2,004.28	14,447,797.37	1,696,616.64	39.78304972	-80.79995403
6,752.00	47.08	323.58	5,323.87	2,854.20	-2,045.53	14,447,855.75	1,696,575.40	39.78321028	-80.80009605
6,846.00	44.75	321.21	5,389.27	2,907.70	-2,086.70	14,447,909.25	1,696,534.22	39.78337466	-80.80024651
6,893.00	40.18	319.54	5,423.93	2,932.14	-2,106.92	14,447,933.69	1,696,514.01	39.78353746	-80.80039182
6,941.00	36.97	317.78	5,461.46	2,954.62	-2,126.67	14,447,956.17	1,696,494.26	39.78369679	-80.80053841
6,988.00	33.49	315.67	5,499.84	2,974.37	-2,145.23	14,447,975.92	1,696,475.69	39.783854091	-80.80068433
7,035.00	29.98	314.36	5,539.81	2,991.86	-2,162.70	14,447,993.41	1,696,458.23	39.78401096	-80.80083033
7,082.00	26.42	312.86	5,581.23	3,007.19	-2,178.76	14,448,008.74	1,696,442.16	39.78416724	-80.80097624
7,129.00	22.55	311.37	5,623.99	3,020.26	-2,193.20	14,448,021.81	1,696,427.73	39.78432292	-80.80112215
7,176.00	19.12	308.29	5,667.91	3,030.99	-2,206.00	14,448,032.54	1,696,414.92	39.78447860	-80.80126806
7,224.00	16.09	304.78	5,713.66	3,039.66	-2,217.64	14,448,041.21	1,696,403.29	39.78463428	-80.80141397
7,271.00	12.97	303.63	5,759.15	3,046.30	-2,227.38	14,448,047.85	1,696,393.54	39.78478996	-80.80155988
7,319.00	10.68	300.47	5,806.13	3,051.54	-2,235.70	14,448,053.09	1,696,385.22	39.78494564	-80.80170579
7,366.00	8.35	293.09	5,852.48	3,055.08	-2,242.60	14,448,056.63	1,696,378.33	39.78510132	-80.80185170
7,414.00	7.96	271.29	5,900.01	3,056.52	-2,249.13	14,448,058.07	1,696,371.80	39.78525700	-80.80199761
7,461.00	8.70	254.94	5,946.52	3,055.67	-2,255.82	14,448,057.22	1,696,365.11	39.78541268	-80.80214352
7,508.00	9.71	240.18	5,992.92	3,052.78	-2,262.69	14,448,054.33	1,696,358.24	39.78556836	-80.80228943
7,538.00	10.29	232.27	6,022.46	3,049.88	-2,267.00	14,448,051.43	1,696,353.92	39.78572404	-80.80243534
7,602.00	12.75	212.75	6,085.19	3,040.44	-2,275.35	14,448,041.99	1,696,345.58	39.78587972	-80.80258125
7,632.00	15.60	201.33	6,114.28	3,033.89	-2,278.61	14,448,035.44	1,696,342.32	39.78603540	-80.80272716

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	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
7,664.00	19.08	192.54	6,144.83	3,024.78	-2,281.31	14,448,026.33	1,696,339.62	39.78368018	-80.80093830
7,696.00	22.20	186.91	6,174.78	3,013.67	-2,283.17	14,448,015.22	1,696,337.75	39.78364968	-80.80094502
7,727.00	25.63	181.90	6,203.11	3,001.15	-2,284.10	14,448,002.70	1,696,336.83	39.78361530	-80.80094842
7,758.00	29.23	177.86	6,230.63	2,986.87	-2,284.04	14,447,988.43	1,696,336.89	39.78357611	-80.80094832
7,790.00	32.92	175.23	6,258.03	2,970.40	-2,283.02	14,447,971.95	1,696,337.90	39.78353085	-80.80094484
7,821.00	36.79	171.89	6,283.47	2,952.80	-2,281.01	14,447,954.35	1,696,339.91	39.78348252	-80.80093782
7,853.00	39.87	167.23	6,308.57	2,933.35	-2,277.39	14,447,934.85	1,696,343.53	39.78342895	-80.80092508
7,884.00	43.60	163.54	6,331.70	2,913.35	-2,272.17	14,447,914.90	1,696,348.76	39.78337413	-80.80090663
7,915.00	47.25	162.31	6,353.46	2,892.25	-2,265.68	14,447,893.80	1,696,355.25	39.78331613	-80.80088370
7,947.00	51.03	159.05	6,374.39	2,869.43	-2,257.65	14,447,870.98	1,696,363.27	39.78325341	-80.80085533
7,978.00	54.64	155.45	6,393.12	2,846.66	-2,248.09	14,447,848.21	1,696,372.84	39.78319083	-80.80082146
8,009.00	58.29	151.76	6,410.25	2,823.54	-2,236.59	14,447,825.09	1,696,384.34	39.78312724	-80.80078071
8,041.00	62.73	150.70	6,426.00	2,799.13	-2,223.18	14,447,800.68	1,696,397.74	39.78306014	-80.80073318
8,073.00	65.41	150.53	6,439.99	2,774.06	-2,209.06	14,447,775.61	1,696,411.86	39.78299119	-80.80068312
8,104.00	66.64	150.26	6,452.58	2,749.43	-2,195.07	14,447,750.98	1,696,425.86	39.78292347	-80.80063351
8,135.00	68.40	150.44	6,464.44	2,724.54	-2,180.90	14,447,726.09	1,696,440.03	39.78285502	-80.80058327
8,167.00	69.76	150.79	6,475.86	2,698.49	-2,166.23	14,447,700.04	1,696,454.69	39.78278341	-80.80053127
8,198.00	69.67	150.70	6,486.61	2,673.12	-2,152.02	14,447,674.67	1,696,468.90	39.78271365	-80.80048089
8,230.00	69.45	150.88	6,497.78	2,646.95	-2,137.39	14,447,648.50	1,696,483.54	39.78264169	-80.80042901
8,261.00	69.45	150.44	6,508.67	2,621.65	-2,123.17	14,447,623.20	1,696,497.76	39.78257211	-80.80037859
8,308.00	71.30	150.88	6,524.45	2,583.06	-2,101.48	14,447,584.61	1,696,519.45	39.78246600	-80.80030169
8,355.00	74.86	150.97	6,538.13	2,543.76	-2,079.63	14,447,545.31	1,696,541.30	39.78235795	-80.80022423
8,402.00	76.00	151.14	6,549.95	2,503.96	-2,057.62	14,447,505.51	1,696,563.31	39.78224850	-80.80014619
8,449.00	77.54	151.49	6,560.71	2,463.82	-2,035.66	14,447,465.37	1,696,585.27	39.78213814	-80.80006834
8,496.00	79.43	151.23	6,570.09	2,423.40	-2,013.58	14,447,424.96	1,696,607.34	39.78202701	-80.79999010
8,543.00	81.19	151.06	6,578.00	2,382.83	-1,991.22	14,447,384.38	1,696,629.70	39.78191544	-80.79991084
8,590.00	82.59	150.53	6,584.63	2,342.21	-1,968.52	14,447,343.77	1,696,652.40	39.78180376	-80.79983035
8,637.00	86.29	150.26	6,589.18	2,301.55	-1,945.42	14,447,303.10	1,696,675.51	39.78169195	-80.79974843
8,731.00	88.44	149.39	6,593.50	2,220.38	-1,898.22	14,447,221.93	1,696,722.71	39.78146874	-80.79958108
8,825.00	88.13	148.86	6,596.32	2,139.74	-1,850.00	14,447,141.29	1,696,770.92	39.78124698	-80.79941011
8,919.00	88.40	149.30	6,599.16	2,059.13	-1,801.73	14,447,060.68	1,696,819.20	39.78102532	-80.79923891
9,013.00	87.78	148.77	6,602.30	1,978.58	-1,753.39	14,446,980.13	1,696,867.54	39.78080379	-80.79906750
9,108.00	88.75	149.12	6,605.17	1,897.23	-1,704.40	14,446,898.78	1,696,916.52	39.78058009	-80.79889380
9,202.00	89.93	149.47	6,606.26	1,816.41	-1,656.41	14,446,817.97	1,696,964.51	39.78035785	-80.79872361
9,296.00	89.10	150.70	6,607.05	1,734.94	-1,609.53	14,446,736.50	1,697,011.39	39.78013582	-80.79855742
9,390.00	89.85	152.29	6,607.91	1,652.35	-1,564.68	14,446,653.90	1,697,056.25	39.77991571	-80.79839842
9,484.00	91.03	152.11	6,607.19	1,569.20	-1,520.84	14,446,570.75	1,697,100.08	39.779697809	-80.79824305
9,579.00	89.85	151.32	6,606.46	1,485.55	-1,475.83	14,446,487.10	1,697,145.10	39.7794808	-80.79808350
9,672.00	90.64	150.62	6,606.06	1,404.23	-1,430.70	14,446,405.79	1,697,190.23	39.77926371	-80.79792353
9,767.00	90.07	150.53	6,605.47	1,321.49	-1,384.03	14,446,323.04	1,697,236.90	39.77904662	-80.79775808
9,861.00	89.19	150.35	6,606.08	1,239.73	-1,337.65	14,446,241.28	1,697,283.27	39.778827213	-80.79759368
9,954.00	89.89	150.44	6,606.83	1,158.87	-1,291.71	14,446,160.42	1,697,329.21	39.7786081	-80.79743081
10,048.00	89.27	150.18	6,607.52	1,077.21	-1,245.15	14,446,078.77	1,697,375.77	39.778392525	-80.79726576
10,142.00	88.53	150.44	6,609.32	995.57	-1,198.60	14,445,997.12	1,697,422.32	39.778176758	-80.79710073
10,236.00	89.63	150.53	6,610.83	913.78	-1,152.30	14,445,915.33	1,697,468.62	39.777961075	-80.79693659
10,330.00	88.92	150.44	6,612.02	831.99	-1,106.00	14,445,833.54	1,697,514.93	39.777745758	-80.79677244
10,424.00	89.49	149.30	6,613.33	750.70	-1,058.82	14,445,752.25	1,697,562.11	39.777530593	-80.79660518
10,519.00	88.88	148.24	6,614.68	669.47	-1,009.57	14,445,671.03	1,697,611.35	39.777315427	-80.79643054
10,613.00	89.41	147.45	6,616.08	589.90	-959.55	14,445,591.46	1,697,661.38	39.777100372	-80.79625315
10,707.00	89.41	148.24	6,617.05	510.32	-909.52	14,445,511.88	1,697,711.40	39.77688518	-80.79607575
10,801.00	90.59	148.95	6,617.05	430.10	-860.54	14,445,431.65	1,697,763.2517	39.776670027	-80.79590207
10,895.00	90.24	148.15	6,616.37	349.91	-811.50	14,445,351.46	1,697,809.42	39.77645469	-80.79572817
10,989.00	89.58	149.74	6,616.51	269.38	-763.01	14,445,270.94	1,697,857.91	39.77623917	-80.79555624
11,084.00	88.62	149.65	6,618.01	187.38	-715.08	14,445,188.93	1,697,905.84	39.77602367	-80.79538361
11,178.00	89.85	150.97	6,619.26	105.73	-668.53	14,445,107.28	1,697,952.40	39.7758081	-80.79521129

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,271.00	89.14	151.14	6,620.08	24.35	-623.52	14,445,025.90	1,697,997.40	39.77542991	-80.79506177
11,364.00	90.33	151.14	6,620.51	-57.10	-578.63	14,444,944.46	1,698,042.29	39.77520595	-80.79490267
11,459.00	89.41	151.06	6,620.73	-140.27	-532.72	14,444,861.29	1,698,088.20	39.77497726	-80.79473995
11,553.00	90.55	150.70	6,620.76	-222.38	-486.98	14,444,779.17	1,698,133.95	39.77475146	-80.79457781
11,647.00	89.76	150.53	6,620.50	-304.29	-440.85	14,444,697.27	1,698,180.07	39.77452623	-80.79441433
11,741.00	90.95	150.26	6,619.92	-386.01	-394.42	14,444,615.54	1,698,226.50	39.77430150	-80.79424973
11,835.00	90.46	150.00	6,618.77	-467.52	-347.61	14,444,534.04	1,698,273.32	39.77407736	-80.79408379
11,930.00	89.49	149.39	6,618.81	-549.54	-299.67	14,444,452.02	1,698,321.25	39.77385182	-80.79391385
12,025.00	89.63	148.42	6,619.54	-630.88	-250.61	14,444,370.67	1,698,370.31	39.77362811	-80.79373991
12,118.00	90.24	147.89	6,619.64	-709.88	-201.54	14,444,291.67	1,698,419.38	39.77341084	-80.79356592
12,213.00	89.85	147.89	6,619.57	-790.35	-151.04	14,444,211.21	1,698,469.88	39.77318953	-80.79338686
12,307.00	89.32	149.30	6,620.25	-870.58	-102.06	14,444,130.98	1,698,518.86	39.77296890	-80.79321320
12,401.00	89.36	151.32	6,621.33	-952.23	-55.51	14,444,049.33	1,698,565.41	39.77274437	-80.79304819
12,495.00	88.48	151.23	6,623.10	-1,034.64	-10.34	14,443,966.91	1,698,610.58	39.77251775	-80.79288812
12,589.00	89.80	150.88	6,624.51	-1,116.89	35.14	14,443,884.67	1,698,656.07	39.77229159	-80.79272691
12,683.00	89.14	150.70	6,625.38	-1,198.93	81.02	14,443,802.63	1,698,701.94	39.77206598	-80.79256433
12,777.00	90.51	150.88	6,625.67	-1,280.98	126.89	14,443,720.58	1,698,747.81	39.77184038	-80.79240175
12,871.00	89.93	150.70	6,625.31	-1,363.02	172.76	14,443,638.54	1,698,793.68	39.77161476	-80.79223917
12,965.00	89.19	150.44	6,626.03	-1,444.89	218.95	14,443,556.67	1,698,839.87	39.77138964	-80.79207548
13,059.00	90.02	150.35	6,626.68	-1,526.62	265.38	14,443,474.94	1,698,886.30	39.77116490	-80.79191089
13,153.00	88.97	150.35	6,627.51	-1,608.30	311.88	14,443,393.26	1,698,932.80	39.77094027	-80.79174608
13,248.00	90.24	149.56	6,628.16	-1,690.53	359.44	14,443,311.03	1,698,980.36	39.77071414	-80.79157749
13,342.00	89.27	149.74	6,628.57	-1,771.65	406.94	14,443,229.91	1,699,027.86	39.77049106	-80.79140913
13,437.00	88.57	149.56	6,630.36	-1,853.62	454.93	14,443,147.94	1,699,075.85	39.77026566	-80.79123901
13,531.00	90.29	149.12	6,631.29	-1,934.47	502.86	14,443,067.09	1,699,123.78	39.77004331	-80.79106911
13,625.00	89.58	149.03	6,631.40	-2,015.10	551.17	14,442,986.46	1,699,172.09	39.76982155	-80.79089786
13,721.00	90.07	150.88	6,631.69	-2,098.20	599.23	14,442,903.36	1,699,220.15	39.76959303	-80.79072750
13,815.00	89.23	150.70	6,632.26	-2,180.25	645.10	14,442,821.32	1,699,266.02	39.76936742	-80.79056494
13,910.00	88.18	150.18	6,634.41	-2,262.86	691.96	14,442,738.70	1,699,312.88	39.76914024	-80.79039888
14,005.00	89.19	150.09	6,636.59	-2,345.22	739.25	14,442,656.34	1,699,360.17	39.76891279	-80.79023126
14,099.00	89.93	150.00	6,637.31	-2,426.66	786.19	14,442,574.90	1,699,407.11	39.76868979	-80.79006491
14,193.00	90.55	149.21	6,636.92	-2,507.74	833.74	14,442,493.82	1,699,454.66	39.76846682	-80.78989634
14,287.00	89.63	148.33	6,636.77	-2,588.11	882.48	14,442,413.45	1,699,503.40	39.76824377	-80.78972357
14,381.00	89.76	148.59	6,637.27	-2,668.23	931.65	14,442,333.33	1,699,552.57	39.76802544	-80.78954926
14,474.00	90.07	149.74	6,637.41	-2,748.08	979.32	14,442,253.48	1,699,600.24	39.76780716	-80.78938029
14,568.00	90.42	151.58	6,637.01	-2,830.02	1,025.38	14,442,171.54	1,699,646.29	39.76758884	-80.78921707
14,662.00	89.58	150.70	6,637.01	-2,912.34	1,070.75	14,442,089.22	1,699,691.66	39.76735414	-80.78905630
14,756.00	88.62	150.18	6,638.49	-2,994.10	1,117.11	14,442,007.47	1,699,738.03	39.76712932	-80.78889198
14,849.00	87.74	150.18	6,641.44	-3,074.74	1,163.34	14,441,926.82	1,699,784.25	39.76690755	-80.78872816
14,874.00	87.47	150.18	6,642.48	-3,096.41	1,175.76	14,441,905.15	1,699,796.68	39.76684795	-80.78868414
Survey @ 14874.00 MD 6642.48 TVD									
14,932.00	87.47	150.18	6,645.04	-3,146.68	1,204.57	14,441,854.88	1,699,825.49	39.76670971	-80.78858203
Survey Proj. to 14932.00 MD 6645.04 TVD									

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Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
179.00	179.00	0.13	0.15	MWD surveys
14,874.00	6,642.48	-3,096.41	1,175.76	Survey @ 14874.00 MD 6642.48 TVD
14,932.00	6,645.04	-3,146.68	1,204.57	Survey Proj. to 14932.00 MD 6645.04 TVD



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Whistlepig S-07HM (slot F)
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-07HM (slot F)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

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