



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan S-09HM (slot I)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+28 @ 1219.00usft (Precision 110)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+28 @ 1219.00usft (Precision 110)
<b>Well:</b>	Bryan S-09HM (slot I)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

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

<b>Site</b>	Bryan Pad				
<b>Site Position:</b>	<b>Northing:</b>	14,445,110.80 usft	<b>Latitude:</b>	39.77562900	
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,703,181.57 usft	<b>Longitude:</b>	-80.77660992
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.143 °

<b>Well</b>	Bryan S-09HM (slot I)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,445,148.23 usft	<b>Latitude:</b>	39.77573187
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,703,172.79 usft	<b>Longitude:</b>	-80.77664087
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,191.00 usft	

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	4/19/2019	-8.696	66.804	51,964.01779049

<b>Design</b>	Surveys Original Hole				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	138.86	

<b>Survey Program</b>	Date 4/30/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
198.00	920.00	MWD surf (Original Hole)	MWD	MWD - Standard
985.00	14,221.00	MWD (Original Hole)	MWD	MWD - Standard
14,276.00	14,276.00	Projection (Original Hole)	MWD	MWD - Standard

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<b>Survey</b>										
<b>Measured</b>	<b>Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>
	0.00	0.00	0.00	0.00	0.00	0.00	14,445,148.23	1,703,172.79	39.77573187	-80.77664087
	198.00	0.35	197.87	198.00	-0.58	-0.19	14,445,147.66	1,703,172.60	39.77573029	-80.77664154
<b>MWD surveys</b>										
	246.00	0.35	166.41	246.00	-0.86	-0.20	14,445,147.38	1,703,172.59	39.77572952	-80.77664158
	293.00	0.30	185.83	293.00	-1.12	-0.17	14,445,147.11	1,703,172.61	39.77572880	-80.77664150
	340.00	0.13	197.00	340.00	-1.29	-0.20	14,445,146.94	1,703,172.58	39.77572832	-80.77664160
	387.00	0.13	232.50	387.00	-1.38	-0.26	14,445,146.86	1,703,172.52	39.77572809	-80.77664181
	434.00	0.13	261.16	434.00	-1.42	-0.36	14,445,146.82	1,703,172.43	39.77572798	-80.77664215
	481.00	0.08	184.51	481.00	-1.46	-0.41	14,445,146.78	1,703,172.37	39.77572787	-80.77664235
	529.00	0.08	261.16	529.00	-1.50	-0.45	14,445,146.74	1,703,172.34	39.77572776	-80.77664247



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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
576.00	0.08	226.18	576.00	-1.52	-0.50	14,445,146.71	1,703,172.28	39.77572769	-80.77664267
622.00	0.13	193.57	622.00	-1.60	-0.54	14,445,146.64	1,703,172.25	39.77572749	-80.77664280
669.00	0.08	280.14	669.00	-1.64	-0.58	14,445,146.59	1,703,172.20	39.77572736	-80.77664296
716.00	0.13	279.79	716.00	-1.63	-0.67	14,445,146.61	1,703,172.12	39.77572740	-80.77664326
761.00	0.21	250.17	761.00	-1.65	-0.80	14,445,146.59	1,703,171.99	39.77572735	-80.77664372
806.00	0.26	253.95	806.00	-1.70	-0.97	14,445,146.53	1,703,171.81	39.77572720	-80.77664434
851.00	0.17	235.32	851.00	-1.77	-1.12	14,445,146.46	1,703,171.66	39.77572702	-80.77664489
896.00	0.13	198.05	896.00	-1.86	-1.20	14,445,146.38	1,703,171.59	39.77572678	-80.77664514
920.00	0.09	218.80	920.00	-1.90	-1.22	14,445,146.34	1,703,171.57	39.77572667	-80.77664521
985.00	0.30	9.61	984.99	-1.77	-1.22	14,445,146.46	1,703,171.57	39.77572702	-80.77664523
1,030.00	0.70	1.61	1,029.99	-1.38	-1.19	14,445,146.86	1,703,171.59	39.77572809	-80.77664512
1,075.00	0.70	349.40	1,074.99	-0.83	-1.23	14,445,147.40	1,703,171.55	39.77572959	-80.77664527
1,120.00	0.48	346.94	1,119.99	-0.38	-1.33	14,445,147.85	1,703,171.46	39.77573084	-80.77664560
1,164.00	0.26	355.02	1,163.99	-0.10	-1.38	14,445,148.13	1,703,171.41	39.77573160	-80.77664578
1,209.00	0.08	20.16	1,208.99	0.03	-1.38	14,445,148.26	1,703,171.41	39.77573197	-80.77664577
1,254.00	0.21	336.21	1,253.99	0.14	-1.40	14,445,148.37	1,703,171.39	39.77573225	-80.77664585
1,344.00	0.74	40.02	1,343.98	0.73	-1.09	14,445,148.97	1,703,171.69	39.77573389	-80.77664475
1,389.00	1.09	49.69	1,388.98	1.23	-0.58	14,445,149.46	1,703,172.21	39.77573526	-80.77664292
1,433.00	1.23	47.05	1,432.97	1.82	0.09	14,445,150.06	1,703,172.87	39.77573688	-80.77664055
1,478.00	1.27	46.00	1,477.96	2.50	0.80	14,445,150.73	1,703,173.58	39.77573873	-80.77663801
1,523.00	1.23	46.61	1,522.95	3.18	1.51	14,445,151.41	1,703,174.29	39.77574059	-80.77663547
1,613.00	1.97	46.61	1,612.91	4.90	3.33	14,445,153.14	1,703,176.12	39.77574532	-80.77662896
1,702.00	3.86	44.59	1,701.79	8.09	6.55	14,445,156.32	1,703,179.34	39.77575404	-80.77661749
1,792.00	4.30	34.31	1,791.56	13.03	10.58	14,445,161.27	1,703,183.36	39.77576759	-80.77660311
1,882.00	3.55	33.17	1,881.35	18.15	14.00	14,445,166.39	1,703,186.79	39.77578163	-80.77659086
1,971.00	4.43	68.41	1,970.15	21.72	18.71	14,445,169.96	1,703,191.49	39.77579140	-80.77657409
2,061.00	4.74	70.43	2,059.86	24.25	25.44	14,445,172.48	1,703,198.23	39.77579829	-80.77655009
2,151.00	3.55	55.32	2,149.63	27.08	31.24	14,445,175.31	1,703,204.03	39.77580603	-80.77652944
2,240.00	2.81	33.61	2,238.49	30.46	34.71	14,445,178.70	1,703,207.50	39.77581530	-80.77651705
2,330.00	2.63	24.55	2,328.39	34.18	36.79	14,445,182.41	1,703,209.58	39.77582549	-80.77650962
2,420.00	2.81	49.61	2,418.29	37.49	39.33	14,445,185.72	1,703,212.12	39.77583455	-80.77650055
2,510.00	3.03	59.89	2,508.18	40.11	43.07	14,445,188.34	1,703,215.85	39.77584173	-80.77648722
2,599.00	2.90	28.95	2,597.06	43.26	46.19	14,445,191.49	1,703,218.98	39.77585036	-80.77647608
2,644.00	2.94	20.60	2,642.01	45.34	47.15	14,445,193.57	1,703,219.94	39.77585606	-80.77647265
2,713.00	3.33	6.01	2,710.90	48.99	47.98	14,445,197.22	1,703,220.77	39.77586607	-80.77646966
2,758.00	3.20	8.03	2,755.83	51.53	48.30	14,445,199.76	1,703,221.08	39.77587306	-80.77646852
2,803.00	2.24	51.54	2,800.78	53.32	49.16	14,445,201.55	1,703,221.95	39.77587797	-80.77646543
2,893.00	4.04	58.92	2,890.64	56.05	53.25	14,445,204.29	1,703,226.04	39.77588544	-80.77645084
2,983.00	3.42	54.70	2,980.45	59.24	58.16	14,445,207.47	1,703,230.94	39.77589416	-80.77643335
3,072.00	4.39	53.38	3,069.25	62.81	63.06	14,445,211.04	1,703,235.85	39.77590392	-80.77641587
3,162.00	4.92	45.12	3,158.95	67.58	68.56	14,445,215.82	1,703,241.34	39.77591700	-80.77639626
3,252.00	5.36	45.56	3,248.59	73.25	74.30	14,445,221.48	1,703,247.08	39.77593253	-80.77637579
3,342.00	8.78	42.83	3,337.89	81.23	81.97	14,445,229.47	1,703,254.75	39.77595440	-80.77634841
3,431.00	10.59	40.46	3,425.62	92.44	91.89	14,445,240.67	1,703,264.68	39.77598510	-80.77631299
3,521.00	12.26	40.99	3,513.83	105.94	103.53	14,445,254.18	1,703,276.31	39.77602211	-80.77627145
3,611.00	14.72	44.15	3,601.34	121.36	117.76	14,445,269.60	1,703,290.55	39.77606436	-80.77622065
3,700.00	16.69	42.31	3,687.02	138.93	134.24	14,445,287.16	1,703,307.03	39.77611249	-80.77616184
3,790.00	17.84	41.34	3,772.96	158.84	152.05	14,445,307.07	1,703,324.84	39.77616704	-80.77609829
3,880.00	18.98	48.20	3,858.36	178.95	172.07	14,445,327.18	1,703,344.86	39.77622213	-80.77602686
3,969.00	20.65	49.60	3,942.09	198.77	194.81	14,445,347.00	1,703,367.60	39.77627640	-80.77594574
4,059.00	23.42	46.17	4,025.51	221.44	219.81	14,445,369.68	1,703,392.59	39.77633851	-80.77585658
4,148.00	25.75	42.92	4,106.44	247.86	245.74	14,445,396.09	1,703,418.52	39.77641087	-80.77576405
4,238.00	27.11	41.96	4,187.03	277.42	272.76	14,445,425.66	1,703,445.55	39.77649188	-80.77566760
4,328.00	25.88	45.30	4,267.59	306.49	300.44	14,445,454.72	1,703,473.22	39.77657152	-80.77556884
4,417.00	26.85	46.70	4,347.33	333.94	328.87	14,445,482.17	1,703,501.66	39.77664670	-80.77546739



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4,507.00	27.46	45.56	4,427.41	362.41	358.48	14,445,510.64	1,703,531.26	39.77672468	-80.77536176
4,597.00	28.21	45.74	4,506.99	391.78	388.53	14,445,540.01	1,703,561.32	39.77680514	-80.77525454
4,686.00	26.45	47.49	4,586.06	419.86	418.21	14,445,568.09	1,703,590.99	39.77688205	-80.77514866
4,776.00	28.82	41.87	4,665.80	449.57	447.47	14,445,597.80	1,703,620.26	39.77696343	-80.77504424
4,866.00	26.63	43.36	4,745.46	480.39	475.80	14,445,628.62	1,703,648.59	39.77704788	-80.77494313
4,955.00	25.97	44.42	4,825.25	508.81	503.14	14,445,657.04	1,703,675.92	39.77712574	-80.77484558
5,045.00	25.83	43.36	4,906.21	537.14	530.39	14,445,685.37	1,703,703.18	39.77720335	-80.777474833
5,135.00	25.75	44.15	4,987.25	565.42	557.47	14,445,713.65	1,703,730.26	39.77728084	-80.77465170
5,224.00	23.95	47.41	5,068.01	591.52	584.24	14,445,739.75	1,703,757.02	39.77735233	-80.77455619
5,314.00	25.62	46.97	5,149.71	617.16	611.91	14,445,765.40	1,703,784.70	39.77742256	-80.77445746
5,404.00	28.47	45.65	5,229.86	645.44	641.48	14,445,793.68	1,703,814.27	39.77750002	-80.77435196
5,493.00	27.20	43.54	5,308.57	675.02	670.67	14,445,823.25	1,703,843.45	39.77758104	-80.77424782
5,583.00	25.44	46.79	5,389.24	703.17	698.93	14,445,851.40	1,703,871.71	39.77765815	-80.777414698
5,673.00	26.14	51.18	5,470.28	728.83	728.47	14,445,877.07	1,703,901.25	39.77772843	-80.77404162
5,762.00	24.30	50.04	5,550.79	752.89	757.78	14,445,901.12	1,703,930.57	39.77779428	-80.77393706
5,852.00	25.31	47.84	5,632.49	777.69	786.24	14,445,925.93	1,703,959.02	39.77786221	-80.77383556
5,942.00	24.52	42.66	5,714.12	804.34	813.16	14,445,952.58	1,703,985.94	39.77793522	-80.77373951
5,990.00	23.69	39.59	5,757.94	819.10	826.05	14,445,967.33	1,703,998.84	39.77797565	-80.777369347
6,035.00	23.38	40.99	5,799.20	832.81	837.67	14,445,981.04	1,704,010.46	39.77801321	-80.77365200
6,080.00	23.69	47.59	5,840.46	845.64	850.20	14,445,993.88	1,704,022.99	39.77804838	-80.77360727
6,125.00	24.04	56.11	5,881.62	856.86	864.49	14,446,005.09	1,704,037.28	39.77807908	-80.77355632
6,170.00	24.48	62.44	5,922.66	866.28	880.37	14,446,014.52	1,704,053.15	39.77810485	-80.77349972
6,214.00	24.97	66.04	5,962.63	874.27	896.94	14,446,022.51	1,704,069.72	39.77812668	-80.777344068
6,259.00	25.71	69.21	6,003.30	881.59	914.74	14,446,029.83	1,704,087.53	39.77814666	-80.77337723
6,304.00	26.42	77.56	6,043.74	887.22	933.65	14,446,035.45	1,704,106.44	39.77816198	-80.77330988
6,349.00	28.31	85.20	6,083.71	890.27	954.07	14,446,038.50	1,704,126.86	39.77817021	-80.77323718
6,393.00	31.69	93.11	6,121.82	890.51	976.02	14,446,038.75	1,704,148.81	39.77817074	-80.77315905
6,438.00	34.07	98.83	6,159.62	887.94	1,000.29	14,446,036.17	1,704,173.07	39.77816349	-80.77307270
6,483.00	36.22	103.66	6,196.42	882.86	1,025.67	14,446,031.10	1,704,198.46	39.77814937	-80.77298241
6,528.00	38.95	108.67	6,232.09	875.19	1,052.00	14,446,023.42	1,704,224.79	39.77812812	-80.77288876
6,573.00	43.03	114.03	6,266.06	864.40	1,079.44	14,446,012.64	1,704,252.23	39.77809830	-80.77279118
6,618.00	46.24	118.16	6,298.08	850.47	1,107.81	14,445,998.71	1,704,280.59	39.77805986	-80.77269035
6,662.00	48.40	121.77	6,327.92	834.31	1,135.81	14,445,982.54	1,704,308.60	39.77801527	-80.77259083
6,707.00	50.95	126.16	6,357.04	815.13	1,164.24	14,445,963.37	1,704,337.02	39.77796240	-80.77248983
6,752.00	54.55	131.96	6,384.29	792.55	1,192.00	14,445,940.78	1,704,364.78	39.77790018	-80.77239122
6,797.00	57.93	135.30	6,409.30	766.73	1,219.05	14,445,914.96	1,704,391.84	39.77782909	-80.77229516
6,842.00	61.54	137.32	6,431.98	738.62	1,245.88	14,445,886.85	1,704,418.67	39.77775171	-80.77219992
6,886.00	66.11	140.57	6,451.39	708.84	1,271.79	14,445,857.08	1,704,444.58	39.77766975	-80.77210798
6,931.00	70.00	141.89	6,468.20	676.30	1,297.92	14,445,824.54	1,704,470.70	39.77758021	-80.77201529
6,976.00	72.53	143.21	6,482.65	642.47	1,323.82	14,445,790.71	1,704,496.61	39.77748712	-80.77192338
7,021.00	75.30	144.27	6,495.12	607.61	1,349.39	14,445,755.84	1,704,522.18	39.77739120	-80.77183269
7,066.00	78.42	144.97	6,505.35	571.88	1,374.76	14,445,720.12	1,704,547.54	39.77729291	-80.77174273
7,111.00	82.59	146.64	6,512.77	535.18	1,399.69	14,445,683.41	1,704,572.48	39.77719193	-80.77165432
7,155.00	86.46	147.69	6,516.97	498.39	1,423.44	14,445,646.62	1,704,596.22	39.77709072	-80.77157014
7,200.00	87.25	147.69	6,519.44	460.41	1,447.45	14,445,608.64	1,704,620.24	39.77698626	-80.77148501
7,245.00	88.22	148.04	6,521.22	422.34	1,471.37	14,445,570.57	1,704,644.16	39.77688153	-80.77140023
7,335.00	90.55	148.48	6,522.18	345.81	1,518.71	14,445,494.04	1,704,691.50	39.77667102	-80.77123243
7,424.00	88.22	148.31	6,523.14	270.02	1,565.35	14,445,418.25	1,704,738.13	39.77646255	-80.77106714
7,514.00	89.58	150.07	6,524.86	192.74	1,611.43	14,445,340.97	1,704,784.22	39.77625000	-80.77090382
7,604.00	89.58	150.51	6,525.52	114.57	1,656.03	14,445,262.80	1,704,828.82	39.77603502	-80.77074578
7,693.00	89.93	149.45	6,525.90	37.51	1,700.56	14,445,185.74	1,704,873.35	39.77582308	-80.77058801
7,783.00	89.85	149.63	6,526.08	-40.07	1,746.18	14,445,108.17	1,704,918.97	39.77560971	-80.77042633
7,873.00	89.76	149.71	6,526.38	-117.75	1,791.63	14,445,030.48	1,704,964.42	39.77539605	-80.77026529
7,963.00	90.11	149.98	6,526.49	-195.57	1,836.84	14,444,952.66	1,705,009.63	39.77518202	-80.77010509
8,052.00	87.60	149.98	6,528.26	-272.61	1,881.36	14,444,875.63	1,705,054.14	39.77497013	-80.76994736

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Survey Report - Geographic



**Company:** Tug Hill Operating LLC  
**Project:** Marshall County, West Virginia.  
**Site:** Bryan Pad  
**Well:** Bryan S-09HM (slot I)  
**Wellbore:** Original Hole  
**Design:** Surveys Original Hole

**Local Co-ordinate Reference:** Well Bryan S-09HM (slot I)  
**TVD Reference:** RKB=1191+28 @ 1219.00usft (Precision 110)  
**MD Reference:** RKB=1191+28 @ 1219.00usft (Precision 110)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** DB\_Jul2216dt\_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,142.00	89.19	149.54	6,530.79	-350.33	1,926.66	14,444,797.91	1,705,099.45	39.77475637	-80.76978682
8,232.00	89.67	149.80	6,531.68	-428.01	1,972.11	14,444,720.23	1,705,144.90	39.77454273	-80.76962579
8,322.00	90.29	149.19	6,531.71	-505.55	2,017.79	14,444,642.69	1,705,190.58	39.77432945	-80.76946390
8,411.00	90.11	149.10	6,531.40	-581.95	2,063.44	14,444,566.28	1,705,236.23	39.77411931	-80.76930215
8,501.00	90.90	148.84	6,530.61	-659.07	2,109.83	14,444,489.17	1,705,282.62	39.77390719	-80.76913775
8,591.00	91.65	148.84	6,528.61	-736.06	2,156.39	14,444,412.17	1,705,329.17	39.77369541	-80.76897275
8,681.00	91.21	153.20	6,526.36	-814.75	2,199.97	14,444,333.48	1,705,372.75	39.77347901	-80.76881837
8,770.00	91.47	150.77	6,524.28	-893.29	2,241.76	14,444,254.94	1,705,414.54	39.77326301	-80.76867037
8,860.00	90.33	151.38	6,522.86	-972.06	2,285.28	14,444,176.18	1,705,458.07	39.77304640	-80.76851619
8,950.00	89.19	150.42	6,523.24	-1,050.69	2,329.05	14,444,097.54	1,705,501.84	39.77283013	-80.76836114
9,040.00	88.00	150.24	6,525.45	-1,128.87	2,373.59	14,444,019.37	1,705,546.37	39.77261512	-80.76820336
9,129.00	88.18	149.71	6,528.41	-1,205.88	2,418.09	14,443,942.35	1,705,590.88	39.77240330	-80.76804566
9,219.00	88.18	149.45	6,531.27	-1,283.45	2,463.64	14,443,864.78	1,705,636.43	39.77218995	-80.76788428
9,308.00	89.49	150.77	6,533.08	-1,360.60	2,507.98	14,443,787.64	1,705,680.77	39.77197778	-80.76772719
9,398.00	89.19	150.42	6,534.12	-1,439.00	2,552.17	14,443,709.24	1,705,724.95	39.77176215	-80.76757066
9,488.00	91.78	147.43	6,533.36	-1,516.06	2,598.61	14,443,632.17	1,705,771.40	39.77155018	-80.76740608
9,577.00	92.62	147.25	6,529.94	-1,590.93	2,646.60	14,443,557.30	1,705,819.39	39.77134421	-80.76723597
9,667.00	92.62	148.48	6,525.83	-1,667.06	2,694.43	14,443,481.17	1,705,867.21	39.77113480	-80.76706648
9,757.00	91.16	149.28	6,522.86	-1,744.07	2,740.91	14,443,404.17	1,705,913.70	39.77092299	-80.76690175
9,847.00	90.59	149.36	6,521.48	-1,821.46	2,786.83	14,443,326.77	1,705,959.61	39.77071012	-80.76673906
9,936.00	90.46	150.42	6,520.67	-1,898.45	2,831.47	14,443,249.79	1,706,004.26	39.77049837	-80.76658088
10,026.00	88.57	152.18	6,521.43	-1,977.38	2,874.69	14,443,170.85	1,706,047.48	39.77028129	-80.76642782
10,116.00	88.53	152.18	6,523.71	-2,056.95	2,916.68	14,443,091.28	1,706,089.46	39.77006246	-80.76627913
10,205.00	89.23	151.65	6,525.45	-2,135.46	2,958.57	14,443,012.78	1,706,131.36	39.76984657	-80.76613077
10,295.00	88.09	151.03	6,527.55	-2,214.41	3,001.72	14,442,933.83	1,706,174.51	39.76962944	-80.76597794
10,385.00	89.71	150.86	6,529.28	-2,293.06	3,045.42	14,442,855.17	1,706,218.21	39.76941311	-80.76582315
10,474.00	89.71	150.95	6,529.73	-2,370.83	3,088.70	14,442,777.40	1,706,261.48	39.76919923	-80.76566986
10,564.00	89.93	151.03	6,530.01	-2,449.54	3,132.34	14,442,698.69	1,706,305.13	39.76898276	-80.76551527
10,653.00	90.02	151.30	6,530.05	-2,527.51	3,175.27	14,442,620.73	1,706,348.05	39.76876834	-80.76536324
10,743.00	90.42	151.03	6,529.70	-2,606.35	3,218.67	14,442,541.89	1,706,391.46	39.76855151	-80.76520950
10,833.00	88.44	150.95	6,530.60	-2,685.05	3,262.32	14,442,463.19	1,706,435.10	39.76833506	-80.76505492
10,922.00	89.19	150.59	6,532.44	-2,762.70	3,305.77	14,442,385.54	1,706,478.55	39.76812150	-80.76490102
11,012.00	89.54	150.42	6,533.44	-2,841.03	3,350.07	14,442,307.21	1,706,522.86	39.76790606	-80.76474407
11,102.00	90.07	150.77	6,533.74	-2,919.43	3,394.26	14,442,228.80	1,706,567.05	39.76769042	-80.76458755
11,192.00	90.59	150.68	6,533.23	-2,997.94	3,438.27	14,442,150.30	1,706,611.06	39.76747451	-80.76443167
11,281.00	91.21	150.51	6,531.83	-3,075.46	3,481.96	14,442,072.77	1,706,654.75	39.76726129	-80.76427691
11,371.00	89.41	150.68	6,531.34	-3,153.86	3,526.15	14,441,994.37	1,706,698.93	39.76704566	-80.76412040
11,461.00	90.29	150.33	6,531.58	-3,232.20	3,570.46	14,441,916.04	1,706,743.24	39.76683021	-80.76396345
11,550.00	90.29	150.77	6,531.13	-3,309.69	3,614.22	14,441,838.54	1,706,787.00	39.76661706	-80.76380846
11,640.00	90.24	151.56	6,530.71	-3,388.53	3,657.62	14,441,759.70	1,706,830.41	39.76640023	-80.76365473
11,730.00	90.77	151.56	6,529.92	-3,467.67	3,700.48	14,441,680.56	1,706,873.27	39.76618259	-80.76350295
11,819.00	91.16	151.21	6,528.42	-3,545.79	3,743.10	14,441,602.45	1,706,915.88	39.76596775	-80.76335203
11,909.00	90.24	150.33	6,527.32	-3,624.32	3,787.04	14,441,523.91	1,706,959.83	39.76575176	-80.76319638
11,998.00	90.02	149.89	6,527.12	-3,701.48	3,831.40	14,441,446.75	1,707,004.18	39.76553953	-80.76303928
12,088.00	88.79	150.15	6,528.05	-3,779.43	3,876.36	14,441,368.80	1,707,049.15	39.76532512	-80.76287999
12,178.00	89.19	149.28	6,529.64	-3,857.14	3,921.74	14,441,291.10	1,707,094.53	39.76511140	-80.76271923
12,268.00	89.67	148.66	6,530.53	-3,934.25	3,968.14	14,441,213.98	1,707,140.92	39.76489927	-80.76255487
12,357.00	89.49	148.48	6,531.19	-4,010.19	4,014.54	14,441,138.04	1,707,187.33	39.76469038	-80.76239044
12,447.00	89.58	148.75	6,531.92	-4,087.02	4,061.41	14,441,061.21	1,707,234.20	39.76447905	-80.76222438
12,537.00	90.29	148.31	6,532.02	-4,163.78	4,108.40	14,440,984.45	1,707,281.18	39.76426790	-80.76207991
12,626.00	90.46	148.48	6,531.44	-4,239.58	4,155.04	14,440,908.65	1,707,327.82	39.76405939	-80.76189265
12,716.00	88.62	149.10	6,532.16	-4,316.55	4,201.67	14,440,831.68	1,707,374.46	39.76384768	-80.76172744
12,806.00	88.97	148.66	6,534.05	-4,393.58	4,248.17	14,440,754.65	1,707,420.96	39.76363579	-80.76156268
12,895.00	89.01	148.66	6,535.62	-4,469.58	4,294.46	14,440,678.65	1,707,467.24	39.76342673	-80.76139871
12,985.00	89.66	148.13	6,536.66	-4,546.23	4,341.62	14,440,602.00	1,707,514.40	39.76321589	-80.76123161



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan S-09HM (slot I)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+28 @ 1219.00usft (Precision 110)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+28 @ 1219.00usft (Precision 110)
<b>Well:</b>	Bryan S-09HM (slot I)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,074.00	90.68	148.13	6,536.40	-4,621.81	4,388.61	14,440,526.42	1,707,561.40	39.76300798	-80.76106511
13,164.00	91.78	148.40	6,534.47	-4,698.34	4,435.94	14,440,449.90	1,707,608.72	39.76279747	-80.76089742
13,254.00	91.30	151.82	6,532.05	-4,776.32	4,480.76	14,440,371.91	1,707,653.55	39.76258296	-80.76073865
13,343.00	90.64	152.62	6,530.54	-4,855.05	4,522.24	14,440,293.18	1,707,695.02	39.76236645	-80.76059181
13,433.00	90.95	152.70	6,529.29	-4,934.99	4,563.57	14,440,213.24	1,707,736.35	39.76214661	-80.76044550
13,523.00	89.27	152.26	6,529.12	-5,014.81	4,605.15	14,440,133.43	1,707,777.94	39.76192711	-80.76029829
13,612.00	89.71	152.53	6,529.91	-5,093.67	4,646.39	14,440,054.56	1,707,819.18	39.76171022	-80.76015230
13,702.00	90.29	152.09	6,529.91	-5,173.36	4,688.21	14,439,974.87	1,707,861.00	39.76149106	-80.76000424
13,791.00	90.42	152.26	6,529.36	-5,252.07	4,729.75	14,439,896.16	1,707,902.54	39.76127460	-80.75985717
13,881.00	90.46	154.99	6,528.67	-5,332.69	4,769.73	14,439,815.54	1,707,942.52	39.76105289	-80.75971568
13,971.00	91.60	155.25	6,527.05	-5,414.33	4,807.59	14,439,733.91	1,707,980.38	39.76082843	-80.75958175
14,061.00	91.12	153.41	6,524.92	-5,495.42	4,846.56	14,439,652.82	1,708,019.35	39.76060544	-80.75944384
14,150.00	91.69	152.97	6,522.73	-5,574.83	4,886.69	14,439,573.41	1,708,059.48	39.76038707	-80.75930180
14,221.00	91.96	152.53	6,520.47	-5,637.91	4,919.19	14,439,510.32	1,708,091.97	39.76021357	-80.75918679
<b>Survey @ 14221.00 MD 6520.47 TVD</b>									
14,276.00	91.96	152.53	6,518.59	-5,686.68	4,944.54	14,439,461.55	1,708,117.33	39.76007945	-80.75909703
<b>Survey projected to 14276.00 MD 6518.59 TVD</b>									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
198.00	198.00	-0.58	-0.19	MWD surveys
14,221.00	6,520.47	-5,637.91	4,919.19	Survey @ 14221.00 MD 6520.47 TVD
14,276.00	6,518.59	-5,686.68	4,944.54	Survey projected to 14276.00 MD 6518.59 TVD

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