



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-06HM (slot B)
<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 N-06HM (slot B)	<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>	0.14 °

<b>Well</b>	Bryan N-06HM (slot B)					
<b>Well Position</b>	+N/-S	0.00 usft	<b>Northing:</b>	14,445,142.16 usft	<b>Latitude:</b>	39.77571503
	+E/-W	0.00 usft	<b>Easting:</b>	1,703,196.45 usft	<b>Longitude:</b>	-80.77655671
<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	3/7/2019	-8.69	66.81	51,977.58749094

<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	339.25

<b>Survey Program</b>	<b>Date</b>	3/30/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
223.00	20,680.00	MWD (Original Hole)	MWD	MWD - Standard	
20,740.00	20,740.00	Projection (Original Hole)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured 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	14,445,142.16	1,703,196.45	39.77571503	-80.77655671	
223.00	0.62	13.65	223.00	1.17	0.28	14,445,143.33	1,703,196.73	39.77571825	-80.77655671	
<b>MWD surveys</b>										
254.00	0.36	10.32	253.99	1.43	0.34	14,445,143.59	1,703,196.79	39.77571896	-80.77655548	
286.00	0.46	79.14	285.99	1.55	0.49	14,445,143.71	1,703,196.93	39.77571930	-80.77655497	
317.00	0.25	218.61	316.99	1.52	0.57	14,445,143.69	1,703,197.01	39.77571922	-80.77655468	
349.00	0.25	64.14	348.99	1.50	0.59	14,445,143.66	1,703,197.03	39.77571915	-80.77655461	
380.00	0.20	321.98	379.99	1.57	0.61	14,445,143.73	1,703,197.06	39.77571935	-80.77655452	
411.00	0.07	350.20	410.99	1.63	0.58	14,445,143.79	1,703,197.02	39.77571952	-80.77655465	
443.00	0.28	353.19	442.99	1.73	0.56	14,445,143.89	1,703,197.01	39.77571978	-80.77655469	
474.00	0.07	193.12	473.99	1.79	0.55	14,445,143.95	1,703,197.00	39.77571994	-80.77655474	

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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
505.00	0.10	145.45	504.99	1.75	0.56	14,445,143.91	1,703,197.01	39.77571983	-80.77655470
537.00	0.60	24.14	536.99	1.88	0.65	14,445,144.04	1,703,197.09	39.77572018	-80.77655440
569.00	0.20	222.43	568.99	1.99	0.68	14,445,144.15	1,703,197.12	39.77572049	-80.77655429
600.00	0.60	121.22	599.99	1.86	0.78	14,445,144.03	1,703,197.23	39.77572015	-80.77655392
631.00	0.34	324.98	630.99	1.86	0.86	14,445,144.02	1,703,197.31	39.77572012	-80.77655362
663.00	0.26	48.24	662.99	1.98	0.86	14,445,144.14	1,703,197.31	39.77572047	-80.77655362
694.00	0.19	213.78	693.99	1.99	0.89	14,445,144.15	1,703,197.34	39.77572048	-80.77655353
725.00	0.27	0.18	724.99	2.02	0.86	14,445,144.18	1,703,197.31	39.77572056	-80.77655363
770.00	0.06	306.72	769.99	2.14	0.84	14,445,144.30	1,703,197.29	39.77572089	-80.77655370
815.00	0.17	222.46	814.99	2.10	0.78	14,445,144.26	1,703,197.22	39.77572080	-80.77655392
860.00	0.24	152.34	859.99	1.97	0.78	14,445,144.13	1,703,197.22	39.77572043	-80.77655393
904.00	0.18	92.72	903.99	1.88	0.89	14,445,144.04	1,703,197.33	39.77572020	-80.77655353
949.00	0.44	38.93	948.99	2.01	1.07	14,445,144.18	1,703,197.51	39.77572056	-80.77655289
994.00	0.63	88.46	993.99	2.16	1.42	14,445,144.32	1,703,197.87	39.77572094	-80.77655163
1,083.00	1.24	65.98	1,082.98	2.56	2.79	14,445,144.72	1,703,199.24	39.77572205	-80.77654675
1,173.00	1.64	80.85	1,172.95	3.16	4.95	14,445,145.32	1,703,201.40	39.77572368	-80.77653905
1,263.00	0.81	79.11	1,262.93	3.49	6.85	14,445,145.65	1,703,203.30	39.77572456	-80.77653230
1,353.00	0.82	83.91	1,352.92	3.68	8.11	14,445,145.84	1,703,204.56	39.77572507	-80.77652780
1,442.00	0.34	84.22	1,441.91	3.77	9.01	14,445,145.93	1,703,205.46	39.77572532	-80.77652461
1,532.00	0.13	227.00	1,531.91	3.73	9.20	14,445,145.89	1,703,205.65	39.77572520	-80.77652393
1,621.00	0.56	85.86	1,620.91	3.69	9.56	14,445,145.85	1,703,206.01	39.77572510	-80.77652265
1,711.00	2.29	61.29	1,710.88	4.59	11.58	14,445,146.75	1,703,208.02	39.77572754	-80.77651547
1,801.00	3.31	72.06	1,800.77	6.25	15.63	14,445,148.41	1,703,212.07	39.77573209	-80.77650104
1,890.00	4.41	72.57	1,889.57	8.07	21.34	14,445,150.23	1,703,217.78	39.77573704	-80.77648070
1,980.00	5.38	67.73	1,979.24	10.70	28.54	14,445,152.86	1,703,224.99	39.77574422	-80.77645503
2,070.00	5.68	74.63	2,068.82	13.48	36.74	14,445,155.64	1,703,233.19	39.77575180	-80.77642583
2,159.00	5.76	73.54	2,157.38	15.91	45.27	14,445,158.07	1,703,241.72	39.77575842	-80.77639545
2,249.00	5.06	74.58	2,246.98	18.25	53.43	14,445,160.41	1,703,249.87	39.77576478	-80.77636639
2,339.00	4.02	81.41	2,336.69	19.78	60.37	14,445,161.94	1,703,256.82	39.77576893	-80.77634166
2,429.00	3.52	86.40	2,426.50	20.42	66.25	14,445,162.58	1,703,262.70	39.77577066	-80.77632074
2,518.00	2.50	81.44	2,515.37	20.88	70.90	14,445,163.04	1,703,267.34	39.77577189	-80.77630420
2,608.00	2.20	85.77	2,605.30	21.30	74.56	14,445,163.46	1,703,271.01	39.77577302	-80.77629115
2,696.00	2.16	83.51	2,633.28	21.40	75.62	14,445,163.56	1,703,272.07	39.77577328	-80.77628738
2,735.00	3.27	59.94	2,732.17	23.02	79.92	14,445,165.19	1,703,276.36	39.77577772	-80.77627207
2,780.00	3.39	60.63	2,777.09	24.32	82.19	14,445,166.48	1,703,278.64	39.77578126	-80.77626398
2,870.00	5.65	54.03	2,866.81	28.23	88.09	14,445,170.39	1,703,284.54	39.77579195	-80.77624292
2,959.00	5.66	68.01	2,955.38	32.44	95.71	14,445,174.61	1,703,292.16	39.77580348	-80.77621578
3,049.00	4.35	80.35	3,045.04	34.68	103.19	14,445,176.84	1,703,299.64	39.77580956	-80.77618914
3,138.00	3.93	81.40	3,133.80	35.70	109.53	14,445,177.86	1,703,305.98	39.77581232	-80.77616655
3,228.00	3.35	83.59	3,223.62	36.46	115.20	14,445,178.62	1,703,311.64	39.77581436	-80.77614639
3,318.00	4.83	73.94	3,313.39	37.80	121.45	14,445,179.96	1,703,317.90	39.77581800	-80.77612412
3,408.00	5.76	70.14	3,403.01	40.38	129.34	14,445,182.54	1,703,325.79	39.77582504	-80.77609601
3,497.00	7.72	66.59	3,491.39	44.27	139.03	14,445,186.43	1,703,335.47	39.77583566	-80.77606150
3,587.00	10.33	65.64	3,580.27	50.00	151.93	14,445,192.16	1,703,348.37	39.77585131	-80.77601554
3,677.00	12.17	66.89	3,668.53	57.06	168.00	14,445,199.22	1,703,364.45	39.77587057	-80.77598285
3,766.00	13.77	68.24	3,755.26	64.67	186.47	14,445,206.83	1,703,382.92	39.77589134	-80.77589246
3,856.00	15.91	66.69	3,842.25	73.52	207.75	14,445,215.68	1,703,404.20	39.77591551	-80.77581664
3,946.00	17.59	72.21	3,928.44	82.56	232.03	14,445,224.72	1,703,428.48	39.77594016	-80.77573014
4,035.00	19.54	77.56	4,012.81	89.87	259.38	14,445,232.03	1,703,455.82	39.77596006	-80.77563276
4,125.00	22.63	79.71	4,096.77	96.21	291.12	14,445,238.37	1,703,487.57	39.77597725	-80.77551972
4,214.00	24.74	75.83	4,178.28	103.83	326.03	14,445,245.99	1,703,522.48	39.77599793	-80.77539541
4,304.00	25.98	71.71	4,259.61	114.63	363.01	14,445,256.79	1,703,559.46	39.77602733	-80.77526369
4,394.00	28.31	70.39	4,339.69	127.98	401.83	14,445,270.14	1,703,598.28	39.77606373	-80.77512538
4,483.00	30.20	68.00	4,417.34	143.45	442.47	14,445,285.61	1,703,638.92	39.77610593	-80.77498060
4,573.00	31.34	69.28	4,494.67	160.21	485.35	14,445,302.37	1,703,681.80	39.77615167	-80.77482784



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4,662.00	34.10	69.43	4,569.54	177.17	530.37	14,445,319.33	1,703,726.82	39.77619793	-80.77466747
4,752.00	35.69	72.54	4,643.36	193.91	579.04	14,445,336.07	1,703,775.49	39.77624357	-80.77449409
4,842.00	37.37	75.93	4,715.68	208.43	630.59	14,445,350.59	1,703,827.03	39.77628309	-80.77431050
4,931.00	39.44	78.50	4,785.43	220.63	684.50	14,445,362.79	1,703,880.94	39.77631623	-80.77411851
5,021.00	40.19	79.57	4,854.56	231.59	741.07	14,445,373.75	1,703,937.52	39.77634593	-80.77391706
5,111.00	38.45	78.56	4,924.18	242.40	797.06	14,445,384.56	1,703,993.51	39.77637523	-80.77371768
5,201.00	39.07	75.57	4,994.37	255.02	851.96	14,445,397.18	1,704,048.41	39.77640950	-80.77352217
5,290.00	40.04	70.94	5,063.00	271.36	906.20	14,445,413.52	1,704,102.64	39.77645400	-80.77332899
5,380.00	41.86	68.69	5,130.98	291.73	961.54	14,445,433.89	1,704,157.99	39.77650956	-80.77215182
5,470.00	41.50	69.35	5,198.20	313.16	1,017.42	14,445,455.32	1,704,213.87	39.77656802	-80.77293275
5,559.00	40.31	70.98	5,265.47	332.94	1,072.23	14,445,475.10	1,704,268.68	39.77662196	-80.77273749
5,649.00	39.66	71.01	5,334.42	351.77	1,126.91	14,445,493.93	1,704,323.36	39.77667330	-80.77254270
5,739.00	39.71	71.25	5,403.69	370.36	1,181.29	14,445,512.52	1,704,377.74	39.77672397	-80.77234898
5,828.00	39.33	72.67	5,472.34	387.90	1,235.14	14,445,530.06	1,704,431.59	39.77677177	-80.77215717
5,918.00	39.23	72.07	5,542.01	405.16	1,289.44	14,445,547.32	1,704,485.89	39.77681878	-80.77196373
6,007.00	39.38	71.64	5,610.87	422.71	1,343.02	14,445,564.87	1,704,539.46	39.77686662	-80.77177290
6,097.00	39.06	72.37	5,680.60	440.30	1,397.14	14,445,582.46	1,704,593.59	39.77691453	-80.77158011
6,187.00	38.19	73.64	5,750.91	456.72	1,450.86	14,445,598.88	1,704,647.31	39.77695926	-80.77138875
6,276.00	39.84	73.78	5,820.06	472.43	1,504.64	14,445,614.60	1,704,701.08	39.77700204	-80.77119721
6,347.00	40.88	73.71	5,874.16	485.30	1,548.78	14,445,627.47	1,704,745.23	39.77703707	-80.77103999
6,435.00	40.70	67.70	5,940.81	504.28	1,602.99	14,445,646.44	1,704,799.43	39.77708679	-80.77084687
6,480.00	40.40	60.69	5,975.02	516.99	1,629.29	14,445,659.15	1,704,825.74	39.77712352	-80.77075313
6,525.00	38.46	53.48	6,009.80	532.47	1,653.27	14,445,674.63	1,704,849.72	39.77716586	-80.77066765
6,569.00	37.58	47.24	6,044.48	549.73	1,674.12	14,445,691.89	1,704,870.57	39.77721311	-80.77059327
6,614.00	37.85	42.23	6,080.08	569.27	1,693.48	14,445,711.43	1,704,889.93	39.77726664	-80.77052419
6,659.00	38.55	38.02	6,115.45	590.54	1,711.40	14,445,732.70	1,704,907.85	39.77732494	-80.77046022
6,704.00	41.10	34.68	6,150.01	613.76	1,728.46	14,445,755.92	1,704,924.91	39.77738858	-80.77039929
6,749.00	44.66	31.25	6,182.99	639.45	1,745.09	14,445,781.61	1,704,941.53	39.77745903	-80.77033987
6,794.00	46.64	27.64	6,214.45	667.47	1,760.89	14,445,809.63	1,704,957.33	39.77753587	-80.77028339
6,838.00	47.21	23.69	6,244.50	696.43	1,774.80	14,445,838.60	1,704,971.24	39.77761530	-80.77023362
6,883.00	47.74	19.91	6,274.93	727.22	1,787.10	14,445,869.38	1,704,983.55	39.77769975	-80.77018953
6,928.00	48.35	16.31	6,305.02	759.02	1,797.50	14,445,901.18	1,704,993.94	39.77778701	-80.77015224
6,972.00	49.45	12.88	6,333.94	791.10	1,805.84	14,445,933.26	1,705,002.29	39.77787505	-80.77012225
7,017.00	51.65	9.01	6,362.54	825.20	1,812.42	14,445,967.36	1,705,008.87	39.77796867	-80.77009853
7,061.00	53.27	4.62	6,389.36	859.83	1,816.54	14,446,001.99	1,705,012.99	39.77806374	-80.77008354
7,106.00	55.91	359.96	6,415.44	896.46	1,817.98	14,446,038.62	1,705,014.43	39.77816432	-80.77007808
7,151.00	60.18	356.09	6,439.26	934.60	1,816.64	14,446,076.76	1,705,013.08	39.77826906	-80.77008252
7,196.00	64.35	354.16	6,460.20	974.27	1,813.24	14,446,116.43	1,705,009.69	39.77837804	-80.77009424
7,241.00	69.54	352.31	6,477.82	1,015.37	1,808.35	14,446,157.53	1,705,004.80	39.77849094	-80.77011127
7,286.00	75.60	350.91	6,491.29	1,057.82	1,802.08	14,446,199.98	1,704,998.53	39.77860757	-80.77013320
7,331.00	78.59	347.48	6,501.34	1,100.89	1,793.85	14,446,243.05	1,704,990.30	39.77872592	-80.77016209
7,375.00	77.27	343.88	6,510.54	1,142.58	1,783.22	14,446,284.74	1,704,979.66	39.77884047	-80.77019957
7,420.00	79.21	339.66	6,519.72	1,184.41	1,769.43	14,446,326.57	1,704,965.88	39.77895544	-80.77024825
7,465.00	83.25	335.09	6,526.58	1,225.43	1,752.32	14,446,367.59	1,704,948.77	39.77906824	-80.77030877
7,510.00	88.09	332.19	6,529.98	1,265.62	1,732.41	14,446,407.78	1,704,928.85	39.77917874	-80.77037930
7,525.00	89.27	332.54	6,530.32	1,278.91	1,725.45	14,446,421.07	1,704,921.90	39.77921528	-80.77040393
7,599.00	90.68	330.16	6,530.36	1,343.84	1,689.97	14,446,486.00	1,704,886.42	39.77939385	-80.77052961
7,689.00	92.57	329.37	6,527.81	1,421.56	1,644.68	14,446,563.72	1,704,841.12	39.77960762	-80.77069014
7,779.00	93.01	330.08	6,523.42	1,499.19	1,599.36	14,446,641.35	1,704,795.80	39.77982113	-80.77085074
7,869.00	92.57	330.60	6,519.04	1,577.31	1,554.87	14,446,719.47	1,704,751.32	39.78003597	-80.77100836
7,959.00	91.30	330.87	6,516.00	1,655.78	1,510.90	14,446,797.94	1,704,707.35	39.78025177	-80.77116415
8,048.00	91.03	331.66	6,514.20	1,733.80	1,466.12	14,446,875.96	1,704,664.57	39.78046635	-80.77131571
8,138.00	89.85	332.54	6,513.50	1,813.33	1,426.01	14,446,955.49	1,704,622.46	39.78068506	-80.77146487
8,228.00	90.02	332.89	6,513.61	1,893.32	1,384.75	14,447,035.48	1,704,581.20	39.78090502	-80.77161100
8,317.00	90.64	333.94	6,513.09	1,972.91	1,344.93	14,447,115.07	1,704,541.37	39.78112386	-80.77175204



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-06HM (slot B)
<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 N-06HM (slot B)	<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

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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
8,407.00	89.27	333.68	6,513.16	2,053.66	1,305.21	14,447,195.83	1,704,501.65	39.78134593	-80.77189269
8,497.00	88.31	332.01	6,515.06	2,133.72	1,264.14	14,447,275.88	1,704,460.59	39.78156608	-80.77203813
8,587.00	87.96	330.16	6,517.99	2,212.46	1,220.65	14,447,354.62	1,704,417.10	39.78178261	-80.77219222
8,676.00	89.85	328.49	6,519.69	2,288.98	1,175.26	14,447,431.14	1,704,371.70	39.78199309	-80.77235310
8,766.00	91.96	331.48	6,518.27	2,366.89	1,130.25	14,447,509.05	1,704,326.70	39.78220736	-80.77251260
8,856.00	90.20	328.67	6,516.58	2,444.87	1,085.37	14,447,587.03	1,704,281.81	39.78242181	-80.77267166
8,946.00	90.55	328.58	6,515.99	2,521.71	1,038.51	14,447,663.87	1,704,234.96	39.78263316	-80.77283775
9,035.00	91.30	328.05	6,514.55	2,597.43	991.77	14,447,739.59	1,704,188.22	39.78284144	-80.77300344
9,125.00	90.15	325.77	6,513.41	2,672.82	942.64	14,447,814.98	1,704,139.09	39.78304883	-80.77317763
9,215.00	91.69	326.56	6,511.97	2,747.57	892.54	14,447,889.73	1,704,088.98	39.78325445	-80.77335530
9,304.00	92.92	329.11	6,508.39	2,822.84	845.20	14,447,965.00	1,704,041.65	39.78346149	-80.77352313
9,394.00	92.40	330.52	6,504.21	2,900.55	800.00	14,448,042.71	1,703,996.44	39.78367522	-80.77368332
9,484.00	89.54	330.52	6,502.69	2,978.88	755.72	14,448,121.04	1,703,952.16	39.78389064	-80.77384023
9,573.00	89.80	330.08	6,503.20	3,056.18	711.62	14,448,198.34	1,703,908.07	39.78410325	-80.77399650
9,663.00	89.27	329.72	6,503.93	3,134.04	666.49	14,448,276.20	1,703,862.94	39.78431739	-80.77415646
9,753.00	90.77	330.16	6,503.90	3,211.94	621.41	14,448,354.10	1,703,817.85	39.78453162	-80.77431622
9,842.00	90.81	329.55	6,502.67	3,288.89	576.72	14,448,431.05	1,703,773.16	39.78474327	-80.77447461
9,932.00	90.33	329.81	6,501.78	3,366.58	531.29	14,448,508.74	1,703,727.73	39.78495693	-80.77463564
10,022.00	90.42	328.85	6,501.19	3,443.99	485.38	14,448,586.15	1,703,681.83	39.78516983	-80.77479836
10,111.00	90.64	331.31	6,500.36	3,521.11	440.99	14,448,663.27	1,703,637.44	39.78538195	-80.77495567
10,201.00	90.55	331.75	6,499.43	3,600.23	398.09	14,448,742.39	1,703,594.54	39.78559951	-80.77510767
10,291.00	90.64	332.27	6,498.49	3,679.69	355.86	14,448,821.85	1,703,552.30	39.78581804	-80.77525730
10,380.00	90.68	331.57	6,497.47	3,758.21	313.97	14,448,900.37	1,703,510.41	39.78603396	-80.77540572
10,470.00	90.51	331.92	6,496.53	3,837.48	271.36	14,448,979.64	1,703,467.81	39.78625196	-80.77555666
10,560.00	89.71	329.90	6,496.36	3,916.13	227.61	14,449,058.29	1,703,424.06	39.78646823	-80.77571171
10,649.00	90.55	329.55	6,496.16	3,992.99	182.74	14,449,135.15	1,703,379.19	39.78667962	-80.77587074
10,739.00	90.33	329.99	6,495.47	4,070.75	137.43	14,449,212.91	1,703,333.88	39.78689348	-80.77603135
10,829.00	91.52	329.46	6,494.02	4,148.46	92.06	14,449,290.62	1,703,288.51	39.78710722	-80.77619215
10,918.00	91.87	329.29	6,491.38	4,225.01	46.74	14,449,367.17	1,703,243.19	39.78731776	-80.77635279
11,008.00	91.82	328.85	6,488.48	4,302.17	0.51	14,449,444.33	1,703,196.96	39.78752998	-80.77651668
11,098.00	91.08	330.25	6,486.21	4,379.73	-45.09	14,449,521.89	1,703,151.36	39.78774330	-80.77667830
11,188.00	91.12	330.60	6,484.48	4,457.99	-89.50	14,449,600.15	1,703,106.95	39.78795852	-80.77683570
11,277.00	89.45	331.75	6,484.04	4,535.96	-132.41	14,449,678.12	1,703,064.04	39.78817294	-80.77698775
11,367.00	89.05	331.83	6,485.22	4,615.26	-174.95	14,449,757.42	1,703,021.50	39.78839101	-80.77713848
11,457.00	90.02	329.72	6,485.95	4,693.80	-218.88	14,449,835.96	1,702,977.56	39.78860699	-80.77729419
11,546.00	90.73	328.58	6,485.36	4,770.20	-264.52	14,449,912.36	1,702,931.93	39.78881713	-80.77745597
11,636.00	90.24	328.41	6,484.60	4,846.93	-311.55	14,449,989.09	1,702,884.90	39.78902818	-80.77762271
11,726.00	90.29	328.85	6,484.18	4,923.78	-358.40	14,450,065.94	1,702,838.05	39.78923953	-80.77778881
11,815.00	90.33	328.58	6,483.70	4,999.83	-404.62	14,450,141.99	1,702,791.83	39.78944872	-80.77795266
11,905.00	91.69	329.46	6,482.12	5,076.98	-450.93	14,450,219.14	1,702,745.51	39.78966090	-80.77811687
11,995.00	91.87	330.60	6,479.32	5,154.91	-495.87	14,450,297.07	1,702,700.58	39.78987521	-80.77827615
12,084.00	92.22	330.25	6,476.15	5,232.26	-539.77	14,450,374.42	1,702,656.68	39.79008795	-80.77843174
12,174.00	90.64	330.60	6,473.90	5,310.51	-584.17	14,450,452.67	1,702,612.27	39.79030314	-80.77858913
12,264.00	90.15	330.34	6,473.28	5,388.82	-628.53	14,450,530.98	1,702,567.91	39.79051849	-80.77874635
12,353.00	90.33	329.81	6,472.91	5,465.95	-672.93	14,450,608.11	1,702,523.52	39.79073062	-80.77890372
12,443.00	90.51	330.08	6,472.25	5,543.85	-718.00	14,450,686.01	1,702,478.44	39.79094485	-80.77906100
12,533.00	90.51	329.99	6,471.45	5,621.81	-762.95	14,450,763.97	1,702,433.49	39.79115928	-80.77922283
12,622.00	90.73	331.48	6,470.48	5,699.45	-808.46	14,450,841.61	1,702,389.99	39.79137277	-80.77937702
12,712.00	91.16	332.19	6,469.00	5,778.78	-848.93	14,450,920.94	1,702,347.51	39.79159093	-80.77952754
12,802.00	91.03	331.92	6,467.28	5,858.27	-891.10	14,451,000.43	1,702,305.34	39.79180952	-80.77967696
12,891.00	91.08	331.31	6,465.64	5,936.56	-933.40	14,451,078.72	1,702,263.04	39.79202480	-80.77982687
12,981.00	90.95	330.96	6,464.04	6,015.36	-976.84	14,451,157.52	1,702,219.60	39.79224151	-80.77998083
13,071.00	90.24	330.25	6,463.11	6,093.77	-1,021.02	14,451,235.93	1,702,175.43	39.79245714	-80.78013739
13,161.00	90.20	329.64	6,462.76	6,171.67	-1,066.09	14,451,313.83	1,702,130.36	39.79267138	-80.78029717
13,250.00	90.02	329.64	6,462.59	6,248.46	-1,111.07	14,451,390.62	1,702,085.37	39.79288258	-80.78045664



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-06HM (slot B)
<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 N-06HM (slot B)	<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

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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
13,339.00	90.29	330.43	6,462.35	6,325.57	-1,155.53	14,451,467.73	1,702,040.92	39.79309462	-80.78061422
13,429.00	91.03	330.87	6,461.32	6,404.01	-1,199.64	14,451,546.17	1,701,996.81	39.79331034	-80.78077057
13,519.00	90.55	331.57	6,460.08	6,482.88	-1,242.96	14,451,625.04	1,701,953.49	39.79352724	-80.78092412
13,608.00	91.52	329.46	6,458.47	6,560.34	-1,286.76	14,451,702.50	1,701,909.69	39.79374025	-80.78107936
13,698.00	91.52	331.04	6,456.08	6,638.44	-1,331.40	14,451,780.61	1,701,865.05	39.79395506	-80.78123761
13,787.00	91.30	330.96	6,453.89	6,716.26	-1,374.53	14,451,858.42	1,701,821.91	39.79416905	-80.78139050
13,877.00	90.77	331.83	6,452.26	6,795.26	-1,417.62	14,451,937.42	1,701,778.83	39.79438630	-80.78154319
13,967.00	90.50	333.20	6,451.27	6,875.10	-1,459.15	14,452,017.26	1,701,737.30	39.79460583	-80.78169036
14,056.00	90.10	330.10	6,450.80	6,953.41	-1,501.40	14,452,095.57	1,701,695.04	39.79482118	-80.78184011
14,146.00	91.00	328.80	6,449.94	7,030.91	-1,547.15	14,452,173.07	1,701,649.30	39.79503433	-80.78200229
14,236.00	91.30	328.10	6,448.13	7,107.59	-1,594.23	14,452,249.75	1,701,602.22	39.79524523	-80.78216924
14,326.00	91.50	328.30	6,445.93	7,184.06	-1,641.64	14,452,326.22	1,701,554.81	39.79545554	-80.78233738
14,415.00	91.40	327.40	6,443.68	7,259.39	-1,688.99	14,452,401.55	1,701,507.46	39.79566273	-80.78250528
14,505.00	91.90	329.20	6,441.09	7,335.93	-1,736.26	14,452,478.09	1,701,460.19	39.79587324	-80.78267291
14,595.00	91.60	329.20	6,438.34	7,413.20	-1,782.32	14,452,555.36	1,701,414.13	39.79608575	-80.78283623
14,685.00	90.50	329.50	6,436.69	7,490.61	-1,828.19	14,452,632.77	1,701,368.25	39.79629865	-80.78299888
14,774.00	90.50	329.60	6,435.91	7,567.33	-1,873.29	14,452,709.49	1,701,323.15	39.79650965	-80.78315879
14,864.00	90.15	329.90	6,435.40	7,645.07	-1,918.63	14,452,787.24	1,701,277.81	39.79672346	-80.78331954
14,954.00	89.49	330.25	6,435.69	7,723.08	-1,963.53	14,452,865.24	1,701,232.92	39.79693797	-80.78347871
15,043.00	88.88	330.16	6,436.95	7,800.30	-2,007.75	14,452,942.46	1,701,188.70	39.79715034	-80.78363547
15,133.00	90.77	329.99	6,437.23	7,878.30	-2,052.65	14,453,020.46	1,701,143.80	39.79736484	-80.78379464
15,223.00	90.99	330.60	6,435.84	7,956.46	-2,097.24	14,453,098.62	1,701,099.21	39.79757980	-80.78395273
15,312.00	90.95	330.34	6,434.34	8,033.89	-2,141.10	14,453,176.05	1,701,055.35	39.79779272	-80.78410822
15,402.00	90.11	330.34	6,433.51	8,112.09	-2,185.63	14,453,254.25	1,701,010.81	39.79800779	-80.78426610
15,491.00	91.78	329.90	6,432.04	8,189.25	-2,229.96	14,453,331.41	1,700,966.48	39.79821997	-80.78442327
15,581.00	91.52	329.90	6,429.45	8,267.08	-2,275.08	14,453,409.24	1,700,921.37	39.79843402	-80.78458324
15,671.00	90.86	329.02	6,427.58	8,344.58	-2,320.80	14,453,486.74	1,700,875.64	39.79864715	-80.78474536
15,760.00	90.46	329.11	6,426.55	8,420.91	-2,366.55	14,453,563.07	1,700,829.90	39.79885708	-80.78490758
15,850.00	91.30	329.20	6,425.17	8,498.17	-2,412.69	14,453,640.33	1,700,783.76	39.79906957	-80.78507119
15,940.00	90.80	330.00	6,423.52	8,575.79	-2,458.22	14,453,717.95	1,700,738.22	39.79928301	-80.78523265
16,030.00	90.60	329.70	6,422.42	8,653.60	-2,503.42	14,453,795.76	1,700,693.02	39.79949702	-80.78539291
16,119.00	91.30	331.90	6,420.94	8,731.28	-2,548.84	14,453,873.44	1,700,649.61	39.79971062	-80.78554681
16,209.00	91.20	332.10	6,418.98	8,810.72	-2,593.08	14,453,952.88	1,700,607.37	39.79992908	-80.78569653
16,299.00	90.80	332.40	6,417.41	8,890.36	-2,639.98	14,454,032.52	1,700,565.47	39.80014805	-80.78584503
16,388.00	90.50	331.00	6,416.40	8,968.72	-2,673.17	14,454,110.88	1,700,523.28	39.80036352	-80.78599458
16,478.00	90.20	330.90	6,415.85	9,047.39	-2,716.87	14,454,189.55	1,700,479.58	39.80057987	-80.78614950
16,568.00	89.80	331.10	6,415.85	9,126.11	-2,760.50	14,454,268.27	1,700,435.95	39.80079633	-80.78630418
16,658.00	91.08	330.87	6,415.16	9,204.81	-2,804.15	14,454,346.97	1,700,392.30	39.80101275	-80.78645893
16,747.00	91.12	330.43	6,413.45	9,282.37	-2,847.77	14,454,424.53	1,700,348.68	39.80122604	-80.78661356
16,837.00	90.86	329.64	6,411.90	9,360.33	-2,892.71	14,454,502.49	1,700,303.74	39.80144043	-80.78677292
16,927.00	90.37	327.79	6,410.93	9,437.23	-2,939.44	14,454,579.39	1,700,257.00	39.80165193	-80.78693866
17,016.00	91.03	329.46	6,409.84	9,513.21	-2,985.77	14,454,655.37	1,700,210.67	39.80186089	-80.78710298
17,106.00	90.90	330.25	6,408.33	9,591.03	-3,030.96	14,454,733.19	1,700,165.48	39.80207489	-80.78726322
17,196.00	90.42	329.29	6,407.29	9,668.78	-3,076.27	14,454,810.94	1,700,120.17	39.80228872	-80.78742388
17,285.00	89.98	329.11	6,406.98	9,745.23	-3,121.85	14,454,887.39	1,700,074.60	39.80249896	-80.78758549
17,375.00	89.45	328.76	6,407.43	9,822.32	-3,168.29	14,454,964.48	1,700,028.16	39.80271098	-80.78775019
17,465.00	90.90	331.40	6,407.15	9,900.31	-3,213.17	14,455,042.47	1,699,983.28	39.80292547	-80.78790935
17,554.00	91.60	332.30	6,405.21	9,978.77	-3,255.15	14,455,120.93	1,699,941.30	39.80314119	-80.78806815
17,644.00	91.20	332.40	6,403.01	10,056.46	-3,296.90	14,455,200.63	1,699,899.54	39.80336034	-80.78820615
17,734.00	90.80	332.10	6,401.44	10,138.10	-3,338.80	14,455,280.26	1,699,857.65	39.80357931	-80.78835466
17,823.00	90.20	331.30	6,400.66	10,216.46	-3,380.99	14,455,358.62	1,699,815.45	39.80379478	-80.78850423
17,913.00	90.68	330.96	6,399.97	10,295.27	-3,424.45	14,455,437.43	1,699,772.00	39.80401150	-80.78865828
18,003.00	90.51	330.87	6,399.04	10,373.92	-3,468.19	14,455,516.08	1,699,728.25	39.80422777	-80.78881339
18,092.00	91.30	330.69	6,397.63	10,451.58	-3,511.63	14,455,593.74	1,699,684.81	39.80444134	-80.78896741
18,182.00	90.95	330.43	6,395.87	10,529.95	-3,555.86	14,455,672.11	1,699,640.59	39.80465683	-80.78912423



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-06HM (slot B)
<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 N-06HM (slot B)	<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

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
18,272.00	90.55	329.90	6,394.69	10,608.01	-3,600.63	14,455,750.17	1,699,595.81	39.80487150	-80.78928299
18,362.00	90.20	329.46	6,394.10	10,685.70	-3,646.07	14,455,827.86	1,699,550.38	39.80508515	-80.78944411
18,451.00	89.63	329.37	6,394.23	10,762.32	-3,691.35	14,455,904.48	1,699,505.10	39.80529585	-80.78960471
18,541.00	90.90	330.30	6,393.82	10,840.12	-3,736.57	14,455,982.29	1,699,459.87	39.80550983	-80.78976508
18,631.00	90.30	329.70	6,392.87	10,918.06	-3,781.57	14,456,060.22	1,699,414.88	39.80572416	-80.78992465
18,720.00	91.70	329.50	6,391.32	10,994.81	-3,826.60	14,456,136.97	1,699,369.85	39.80593522	-80.79008435
18,810.00	91.80	329.70	6,388.57	11,072.40	-3,872.12	14,456,214.56	1,699,324.33	39.80614860	-80.79024579
18,899.00	91.60	329.40	6,385.93	11,149.09	-3,917.20	14,456,291.25	1,699,279.24	39.80635950	-80.79040568
18,989.00	91.30	329.00	6,383.65	11,226.37	-3,963.27	14,456,368.53	1,699,233.17	39.80657203	-80.79056907
19,079.00	91.10	328.50	6,381.77	11,303.30	-4,009.95	14,456,445.46	1,699,186.49	39.80678359	-80.79073465
19,169.00	91.74	329.64	6,379.54	11,380.48	-4,056.20	14,456,522.64	1,699,140.25	39.80699583	-80.79089867
19,258.00	91.43	329.81	6,377.08	11,457.31	-4,101.05	14,456,599.47	1,699,095.40	39.80720712	-80.79105773
19,348.00	90.99	329.99	6,375.18	11,535.15	-4,146.18	14,456,677.31	1,699,050.27	39.80742120	-80.79121777
19,438.00	90.55	331.04	6,373.97	11,613.49	-4,190.47	14,456,755.65	1,699,005.98	39.80763661	-80.79137484
19,527.00	90.37	331.83	6,373.25	11,691.65	-4,233.02	14,456,833.81	1,698,963.42	39.80785154	-80.79152571
19,617.00	89.85	331.75	6,373.08	11,770.96	-4,275.57	14,456,913.12	1,698,920.88	39.80806962	-80.79167654
19,707.00	89.41	332.01	6,373.66	11,850.34	-4,317.98	14,456,992.50	1,698,878.46	39.80828787	-80.79182693
19,797.00	89.80	330.30	6,374.28	11,929.16	-4,361.40	14,457,071.33	1,698,835.05	39.80850463	-80.79198088
19,886.00	92.00	329.50	6,372.88	12,006.15	-4,406.03	14,457,148.31	1,698,790.42	39.80871634	-80.79213914
19,976.00	91.70	329.10	6,369.98	12,083.49	-4,451.95	14,457,225.66	1,698,744.50	39.80892904	-80.79230204
20,065.00	91.20	328.10	6,367.73	12,159.44	-4,498.30	14,457,301.60	1,698,698.14	39.80913789	-80.79246647
20,155.00	92.70	329.64	6,364.66	12,236.43	-4,544.80	14,457,378.59	1,698,651.64	39.80934962	-80.79263141
20,245.00	92.79	329.72	6,360.35	12,314.03	-4,590.19	14,457,456.19	1,698,606.26	39.80956302	-80.79279237
20,335.00	91.96	328.76	6,356.62	12,391.30	-4,636.18	14,457,533.46	1,698,560.27	39.80977552	-80.79295550
20,424.00	92.22	328.93	6,353.38	12,467.41	-4,682.19	14,457,609.57	1,698,514.26	39.80998484	-80.79311872
20,514.00	92.18	329.20	6,349.92	12,544.55	-4,728.42	14,457,686.71	1,698,468.03	39.81019698	-80.79328272
20,604.00	92.04	329.37	6,346.61	12,621.87	-4,774.36	14,457,764.03	1,698,422.09	39.81040962	-80.79344566
20,680.00	90.59	327.26	6,344.86	12,686.52	-4,814.26	14,457,828.68	1,698,382.18	39.81058742	-80.79358723
<b>Survey @ 20680.00 MD 6344.86 TVD</b>									
20,740.00	90.59	327.26	6,344.25	12,736.99	-4,846.71	14,457,879.15	1,698,349.73	39.81072621	-80.79370236
<b>Survey projected to 20740.00 MD 6344.25 TVD</b>									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
223.00	223.00	1.17	0.28	MWD surveys
20,680.00	6,344.86	12,686.52	-4,814.26	Survey @ 20680.00 MD 6344.86 TVD
20,740.00	6,344.25	12,736.99	-4,846.71	Survey projected to 20740.00 MD 6344.25 TVD

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