



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-03HM (slot N)
<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-03HM (slot N)	<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 N-03HM (slot N)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,445,088.28 usft	<b>Latitude:</b>	39.77556711
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,703,190.38 usft	<b>Longitude:</b>	-80.77657879
<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	5/15/2019	-8.698	66.797	51,955.70966807

<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	325.66	

<b>Survey Program</b>	Date 6/3/2019				
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
241.00	935.00	MWD surf (Original Hole)	MWD	MWD - Standard	
947.00	17,336.00	MWD (Original Hole)	MWD	MWD - Standard	
17,393.00	17,393.00	Projection (Original Hole)	MWD	MWD - Standard	

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<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	14,445,088.28	1,703,190.38	39.77556711	-80.77657879	
241.00	0.39	144.00	241.00	-0.66	0.48	14,445,087.62	1,703,190.86	39.77556529	-80.77657708	
<b>MWD surveys</b>										
288.00	0.26	156.92	288.00	-0.89	0.62	14,445,087.39	1,703,191.00	39.77556466	-80.77657660	
335.00	0.30	141.54	335.00	-1.09	0.74	14,445,087.20	1,703,191.11	39.77556413	-80.77657618	
382.00	0.35	188.54	382.00	-1.32	0.79	14,445,086.96	1,703,191.17	39.77556347	-80.77657599	
429.00	0.21	217.65	429.00	-1.53	0.72	14,445,086.75	1,703,191.09	39.77556289	-80.77657625	
476.00	0.26	168.52	476.00	-1.71	0.69	14,445,086.58	1,703,191.06	39.77556242	-80.77657636	
523.00	0.13	124.84	522.99	-1.84	0.75	14,445,086.44	1,703,191.13	39.77556205	-80.77657613	
570.00	0.17	236.90	569.99	-1.91	0.74	14,445,086.37	1,703,191.11	39.77556186	-80.77657619	



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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
617.00	0.17	235.84	616.99	-1.99	0.62	14,445,086.30	1,703,191.00	39.77556165	-80.77657660
664.00	0.04	81.16	663.99	-2.02	0.58	14,445,086.26	1,703,190.96	39.77556155	-80.77657675
711.00	0.13	261.16	710.99	-2.03	0.54	14,445,086.25	1,703,190.92	39.77556153	-80.77657688
756.00	0.13	261.16	755.99	-2.05	0.44	14,445,086.24	1,703,190.82	39.77556149	-80.77657724
801.00	0.08	167.29	800.99	-2.08	0.40	14,445,086.20	1,703,190.78	39.77556139	-80.77657739
846.00	0.13	65.95	845.99	-2.09	0.45	14,445,086.19	1,703,190.83	39.77556136	-80.77657720
890.00	0.13	8.65	889.99	-2.02	0.50	14,445,086.26	1,703,190.88	39.77556155	-80.77657701
935.00	0.13	261.16	934.99	-1.98	0.46	14,445,086.30	1,703,190.84	39.77556167	-80.77657716
947.00	0.39	225.38	946.99	-2.01	0.42	14,445,086.27	1,703,190.80	39.77556158	-80.77657732
980.00	0.74	262.82	979.99	-2.12	0.13	14,445,086.17	1,703,190.51	39.77556129	-80.77657835
1,008.00	1.36	221.34	1,007.99	-2.39	-0.27	14,445,085.89	1,703,190.11	39.77556055	-80.77657978
1,070.00	2.02	197.96	1,069.96	-3.98	-1.09	14,445,084.30	1,703,189.28	39.77555618	-80.77658272
1,115.00	2.81	194.09	1,114.92	-5.81	-1.61	14,445,082.48	1,703,188.77	39.77555118	-80.77658456
1,159.00	3.38	192.60	1,158.86	-8.12	-2.15	14,445,080.17	1,703,188.22	39.77554483	-80.77658652
1,204.00	3.73	189.79	1,203.77	-10.86	-2.69	14,445,077.43	1,703,187.69	39.77553732	-80.77658846
1,249.00	3.51	190.32	1,248.68	-13.65	-3.19	14,445,074.63	1,703,187.19	39.77552964	-80.77659025
1,294.00	3.20	195.24	1,293.60	-16.22	-3.76	14,445,072.06	1,703,186.61	39.77552259	-80.77659233
1,339.00	2.28	202.36	1,338.55	-18.26	-4.43	14,445,070.02	1,703,185.94	39.77551700	-80.77659473
1,384.00	1.88	206.58	1,383.52	-19.75	-5.10	14,445,068.54	1,703,185.27	39.77551291	-80.77659713
1,428.00	2.19	214.49	1,427.49	-21.09	-5.90	14,445,067.20	1,703,184.47	39.77550924	-80.77659999
1,518.00	2.98	206.31	1,517.40	-24.60	-7.91	14,445,063.68	1,703,182.46	39.77549961	-80.77660718
1,608.00	3.38	202.01	1,607.26	-29.16	-9.95	14,445,059.13	1,703,180.43	39.77548711	-80.77661445
1,697.00	3.91	201.13	1,696.08	-34.42	-12.02	14,445,053.86	1,703,178.35	39.77547267	-80.77662189
1,787.00	2.41	207.10	1,785.94	-38.97	-13.99	14,445,049.32	1,703,176.39	39.77546019	-80.77662893
1,877.00	1.01	219.93	1,875.90	-41.26	-15.36	14,445,047.02	1,703,175.02	39.77545391	-80.77663383
1,966.00	0.70	251.31	1,964.89	-42.04	-16.38	14,445,046.25	1,703,174.00	39.77545178	-80.77663747
2,056.00	1.36	217.91	2,054.88	-43.05	-17.56	14,445,045.23	1,703,172.82	39.77544899	-80.77664166
2,146.00	2.10	221.78	2,144.84	-45.13	-19.31	14,445,043.16	1,703,171.06	39.77544331	-80.77664793
2,235.00	1.71	209.92	2,233.79	-47.49	-21.06	14,445,040.79	1,703,169.32	39.77543683	-80.77665417
2,325.00	1.75	192.69	2,323.75	-50.00	-22.03	14,445,038.29	1,703,168.34	39.77542995	-80.77665765
2,415.00	1.71	179.68	2,413.71	-52.68	-22.33	14,445,035.60	1,703,168.05	39.77542259	-80.77665873
2,505.00	1.58	186.71	2,503.67	-55.26	-22.47	14,445,033.03	1,703,167.91	39.77541552	-80.77665924
2,594.00	1.49	196.12	2,592.64	-57.59	-22.93	14,445,030.70	1,703,167.45	39.77540912	-80.77666091
2,649.00	1.53	195.06	2,647.62	-58.98	-23.32	14,445,029.30	1,703,167.06	39.77540529	-80.77666231
2,706.00	1.31	194.45	2,704.60	-60.35	-23.68	14,445,027.93	1,703,166.70	39.77540154	-80.77666360
2,796.00	1.27	199.63	2,794.58	-62.28	-24.27	14,445,026.00	1,703,166.11	39.77539623	-80.77666573
2,886.00	1.09	213.34	2,884.56	-63.94	-25.08	14,445,024.34	1,703,165.30	39.77539169	-80.77666861
2,975.00	2.28	229.87	2,973.52	-65.79	-26.90	14,445,022.50	1,703,163.48	39.77538663	-80.77667510
3,065.00	2.54	209.74	3,063.44	-68.67	-29.25	14,445,019.61	1,703,161.12	39.77537872	-80.77668352
3,155.00	1.84	205.78	3,153.38	-71.71	-30.87	14,445,016.58	1,703,159.51	39.77537040	-80.77668930
3,245.00	3.69	213.52	3,243.27	-75.42	-33.10	14,445,012.86	1,703,157.28	39.77536021	-80.77669727
3,334.00	3.60	215.89	3,332.09	-80.07	-36.32	14,445,008.21	1,703,154.06	39.77534746	-80.77670877
3,424.00	4.65	214.49	3,421.85	-85.37	-40.04	14,445,002.91	1,703,150.34	39.77533294	-80.77672206
3,514.00	7.60	201.30	3,511.33	-93.92	-44.27	14,444,994.36	1,703,146.11	39.77530948	-80.77673719
3,603.00	8.61	209.65	3,599.45	-105.20	-49.70	14,444,983.09	1,703,140.67	39.77527855	-80.77675663
3,693.00	10.23	210.71	3,688.23	-117.92	-57.12	14,444,970.36	1,703,133.26	39.77524365	-80.77678313
3,783.00	11.99	204.20	3,776.54	-133.32	-65.03	14,444,954.96	1,703,125.34	39.77520141	-80.77681143
3,872.00	14.06	199.37	3,863.25	-151.96	-72.41	14,444,936.33	1,703,117.97	39.77515029	-80.77683785
3,962.00	16.34	202.09	3,950.10	-174.00	-80.80	14,444,914.28	1,703,109.58	39.77508980	-80.77686790
4,052.00	17.88	202.53	4,036.11	-198.50	-90.85	14,444,889.79	1,703,099.52	39.77502260	-80.77690391
4,141.00	17.88	198.49	4,120.82	-224.08	-100.42	14,444,864.21	1,703,089.96	39.77495242	-80.77693819
4,231.00	16.08	198.40	4,206.89	-249.01	-108.74	14,444,839.28	1,703,081.64	39.77488401	-80.77696801
4,320.00	16.39	206.58	4,292.35	-271.94	-118.25	14,444,816.35	1,703,072.13	39.77482111	-80.77700206
4,410.00	19.29	209.04	4,378.02	-296.29	-131.15	14,444,791.99	1,703,059.29	39.77475430	-80.77704819
4,500.00	20.87	204.11	4,462.55	-323.93	-144.92	14,444,764.36	1,703,045.46	39.77467851	-80.77709743



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4,589.00	17.31	196.64	4,546.65	-351.10	-155.19	14,444,737.19	1,703,035.19	39.77460396	-80.77713423
4,679.00	16.25	189.35	4,632.83	-376.35	-161.07	14,444,711.93	1,703,029.31	39.77453464	-80.77715539
4,768.00	15.33	201.21	4,718.49	-399.62	-167.35	14,444,688.67	1,703,023.03	39.77447080	-80.77717795
4,858.00	16.12	208.16	4,805.13	-421.72	-177.55	14,444,666.56	1,703,012.83	39.77441015	-80.77721445
4,948.00	17.97	211.94	4,891.18	-444.52	-190.79	14,444,643.76	1,702,999.58	39.77434763	-80.77726179
5,038.00	19.59	209.21	4,976.39	-469.48	-205.50	14,444,618.81	1,702,984.87	39.77427920	-80.77731436
5,127.00	18.58	205.70	5,060.49	-495.28	-218.93	14,444,593.01	1,702,971.44	39.77420844	-80.77736239
5,217.00	16.83	202.80	5,146.23	-520.21	-230.20	14,444,568.07	1,702,960.18	39.77414004	-80.77740271
5,307.00	18.14	200.69	5,232.07	-545.33	-240.20	14,444,542.95	1,702,950.18	39.77407113	-80.77743852
5,396.00	16.65	197.17	5,317.00	-570.48	-248.86	14,444,517.81	1,702,941.52	39.77400213	-80.77746956
5,486.00	18.58	201.83	5,402.78	-596.11	-258.00	14,444,492.18	1,702,932.38	39.77393180	-80.77750232
5,576.00	17.13	200.86	5,488.44	-621.81	-268.05	14,444,466.48	1,702,922.32	39.77386129	-80.77753832
5,665.00	16.96	203.94	5,573.54	-645.92	-277.99	14,444,442.37	1,702,912.39	39.77379514	-80.77757389
5,718.00	18.33	200.43	5,624.04	-660.79	-284.03	14,444,427.49	1,702,906.34	39.77375433	-80.77759554
5,807.00	19.52	204.12	5,708.23	-687.48	-295.00	14,444,400.80	1,702,895.38	39.77368111	-80.77763479
5,852.00	17.49	218.01	5,750.93	-699.68	-302.24	14,444,388.61	1,702,888.14	39.77364767	-80.77766067
5,897.00	16.00	232.24	5,794.03	-708.81	-311.31	14,444,379.48	1,702,879.07	39.77362265	-80.77769304
5,942.00	14.15	244.64	5,837.50	-714.96	-321.18	14,444,373.32	1,702,869.19	39.77360582	-80.77772824
5,987.00	13.01	260.46	5,881.25	-718.16	-331.15	14,444,370.12	1,702,859.22	39.77359711	-80.77776375
6,032.00	13.98	289.77	5,925.01	-719.02	-341.59	14,444,369.26	1,702,848.79	39.77359481	-80.77780089
6,076.00	15.78	281.11	5,967.55	-717.89	-352.78	14,444,370.39	1,702,837.60	39.77359800	-80.77784070
6,121.00	17.58	291.92	6,010.66	-714.17	-365.09	14,444,374.11	1,702,825.29	39.77360829	-80.77788449
6,166.00	19.69	297.99	6,053.30	-708.08	-378.09	14,444,380.21	1,702,812.29	39.77362512	-80.77793071
6,211.00	21.27	303.26	6,095.46	-700.04	-391.61	14,444,388.24	1,702,798.77	39.77364728	-80.77797876
6,255.00	24.26	306.16	6,136.03	-690.33	-405.59	14,444,397.96	1,702,784.79	39.77367405	-80.77802841
6,345.00	31.16	311.43	6,215.67	-663.97	-438.02	14,444,424.31	1,702,752.36	39.77374664	-80.77814360
6,390.00	35.12	315.83	6,253.35	-646.98	-455.77	14,444,441.31	1,702,734.60	39.77379344	-80.77820665
6,435.00	39.30	317.06	6,289.18	-627.25	-474.51	14,444,461.03	1,702,715.87	39.77384774	-80.77827316
6,525.00	47.74	316.00	6,354.39	-582.35	-517.14	14,444,505.94	1,702,673.24	39.77397135	-80.77842448
6,614.00	57.45	316.79	6,408.39	-531.19	-565.82	14,444,557.09	1,702,624.56	39.77411216	-80.77859728
6,704.00	68.40	318.20	6,449.29	-472.17	-619.84	14,444,616.11	1,702,570.54	39.77427461	-80.77878904
6,793.00	76.44	322.86	6,476.16	-406.71	-673.65	14,444,681.58	1,702,516.72	39.77445478	-80.77897998
6,883.00	84.57	329.01	6,491.01	-333.24	-723.26	14,444,755.05	1,702,467.12	39.77465688	-80.77915589
6,973.00	87.60	331.30	6,497.15	-255.37	-767.93	14,444,832.91	1,702,422.44	39.77487103	-80.77931421
7,062.00	88.57	330.33	6,500.13	-177.71	-811.31	14,444,910.57	1,702,379.07	39.77508459	-80.77946790
7,152.00	88.18	330.51	6,502.68	-99.47	-855.72	14,444,988.81	1,702,334.66	39.77529975	-80.77962527
7,242.00	87.74	330.15	6,505.88	-21.32	-900.24	14,445,066.96	1,702,290.14	39.77551467	-80.77978305
7,331.00	91.30	330.15	6,506.63	55.85	-944.53	14,445,144.14	1,702,245.85	39.77572692	-80.77994000
7,421.00	91.12	330.42	6,504.73	134.00	-989.13	14,445,222.28	1,702,201.25	39.77594184	-80.78009806
7,511.00	91.78	329.45	6,502.45	211.87	-1,034.20	14,445,300.15	1,702,156.17	39.77615598	-80.78025780
7,600.00	91.30	329.36	6,500.06	288.45	-1,079.49	14,445,376.73	1,702,110.89	39.77636660	-80.78041830
7,690.00	91.30	329.28	6,498.02	365.83	-1,125.40	14,445,454.11	1,702,064.98	39.77657943	-80.78058103
7,780.00	91.30	328.24	6,495.98	442.76	-1,172.06	14,445,531.04	1,702,018.32	39.77679101	-80.78074644
7,869.00	91.25	328.48	6,494.00	518.51	-1,218.73	14,445,606.80	1,701,971.64	39.77699936	-80.78091191
7,959.00	90.90	328.48	6,492.31	595.22	-1,265.78	14,445,683.50	1,701,924.60	39.77721034	-80.78107868
8,049.00	90.59	328.48	6,491.14	671.93	-1,312.83	14,445,760.22	1,701,877.55	39.77742133	-80.78124546
8,139.00	90.15	328.84	6,490.56	748.80	-1,359.64	14,445,837.09	1,701,830.74	39.77763274	-80.78141140
8,228.00	89.85	329.19	6,490.56	825.10	-1,405.45	14,445,913.38	1,701,784.92	39.77784259	-80.78157382
8,318.00	90.95	330.77	6,489.93	903.02	-1,450.48	14,445,991.31	1,701,739.90	39.77805689	-80.78173339
8,408.00	90.81	330.77	6,488.55	981.55	-1,494.42	14,446,069.84	1,701,695.96	39.77827285	-80.78188912
8,498.00	90.55	330.24	6,487.48	1,059.88	-1,538.73	14,446,148.17	1,701,651.65	39.77848826	-80.78204614
8,587.00	90.24	330.24	6,486.86	1,137.14	-1,582.90	14,446,225.43	1,701,607.47	39.77870073	-80.78220271
8,677.00	89.54	329.80	6,487.04	1,215.10	-1,627.88	14,446,303.38	1,701,562.50	39.77891512	-80.78236210
8,767.00	91.21	330.42	6,486.45	1,293.12	-1,672.72	14,446,381.41	1,701,517.65	39.77912970	-80.78252105
8,857.00	91.08	330.77	6,484.65	1,371.51	-1,716.90	14,446,459.80	1,701,473.47	39.77934527	-80.78267762

WV Department of Environmental Protection



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-03HM (slot N)
<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-03HM (slot N)	<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
8,946.00	91.25	330.24	6,482.84	1,448.96	-1,760.71	14,446,537.25	1,701,429.66	39.77955826	-80.78283289
9,036.00	90.95	330.24	6,481.11	1,527.08	-1,805.38	14,446,615.36	1,701,385.00	39.77977309	-80.78299119
9,126.00	90.73	329.98	6,479.79	1,605.10	-1,850.22	14,446,693.38	1,701,340.15	39.77998765	-80.78315014
9,215.00	90.11	330.07	6,479.14	1,682.19	-1,894.69	14,446,770.48	1,701,295.69	39.78019966	-80.78330774
9,305.00	89.98	330.33	6,479.07	1,760.29	-1,939.42	14,446,848.57	1,701,250.96	39.78041444	-80.78346627
9,395.00	89.63	330.07	6,479.38	1,838.39	-1,984.14	14,446,926.67	1,701,206.23	39.78062922	-80.78362480
9,484.00	89.01	330.33	6,480.43	1,915.61	-2,028.37	14,447,003.90	1,701,162.01	39.78084159	-80.78378156
9,574.00	91.87	329.54	6,479.74	1,993.49	-2,073.45	14,447,081.78	1,701,116.92	39.78105577	-80.78394136
9,664.00	91.74	329.45	6,476.91	2,071.00	-2,119.12	14,447,159.28	1,701,071.26	39.78126892	-80.78410322
9,753.00	91.47	330.07	6,474.41	2,147.86	-2,163.92	14,447,236.14	1,701,026.46	39.78148030	-80.78426204
9,843.00	91.16	329.71	6,472.35	2,225.69	-2,209.06	14,447,313.98	1,700,981.32	39.78169435	-80.78442204
9,933.00	90.59	329.36	6,470.97	2,303.26	-2,254.68	14,447,391.54	1,700,935.69	39.78190767	-80.78458378
10,022.00	90.20	329.54	6,470.36	2,379.90	-2,299.92	14,447,468.18	1,700,890.46	39.78211845	-80.78474414
10,112.00	89.41	329.19	6,470.67	2,457.34	-2,345.78	14,447,545.62	1,700,844.60	39.78233142	-80.78490671
10,202.00	90.99	329.80	6,470.35	2,534.88	-2,391.46	14,447,623.16	1,700,798.91	39.78254466	-80.78506866
10,291.00	90.64	330.33	6,469.09	2,612.00	-2,435.87	14,447,700.28	1,700,754.51	39.78275675	-80.78522607
10,381.00	91.69	330.33	6,467.26	2,690.18	-2,480.41	14,447,778.46	1,700,709.97	39.78297175	-80.78538395
10,471.00	91.30	330.15	6,464.91	2,768.28	-2,525.07	14,447,856.57	1,700,665.31	39.78318654	-80.78554224
10,560.00	90.68	329.80	6,463.37	2,845.33	-2,569.60	14,447,933.61	1,700,620.78	39.78339842	-80.78570008
10,650.00	91.96	330.07	6,461.30	2,923.20	-2,614.67	14,448,011.48	1,700,575.71	39.78361256	-80.78585986
10,740.00	91.56	329.98	6,458.53	3,001.12	-2,659.62	14,448,089.40	1,700,530.76	39.78382686	-80.78601918
10,829.00	91.47	330.07	6,456.18	3,078.19	-2,704.07	14,448,166.47	1,700,486.31	39.78403881	-80.78617675
10,919.00	91.34	329.89	6,453.97	3,156.09	-2,749.08	14,448,244.38	1,700,441.30	39.78425304	-80.78633632
11,009.00	90.64	329.89	6,452.42	3,233.94	-2,794.22	14,448,322.22	1,700,396.15	39.78446712	-80.78649635
11,099.00	89.63	329.71	6,452.21	3,311.72	-2,839.49	14,448,400.00	1,700,350.88	39.78468103	-80.78665683
11,188.00	89.23	329.71	6,453.09	3,388.57	-2,884.38	14,448,476.85	1,700,306.00	39.78489237	-80.78681596
11,278.00	90.07	329.98	6,453.64	3,466.38	-2,929.59	14,448,554.67	1,700,260.79	39.78510637	-80.78697623
11,367.00	89.76	329.36	6,453.77	3,543.20	-2,974.53	14,448,631.49	1,700,215.84	39.78531763	-80.78713556
11,457.00	91.25	329.54	6,452.98	3,620.70	-3,020.28	14,448,708.99	1,700,170.10	39.78553077	-80.78729773
11,547.00	90.90	329.98	6,451.29	3,698.44	-3,065.59	14,448,786.73	1,700,124.78	39.78574456	-80.78745839
11,636.00	90.20	330.24	6,450.44	3,775.60	-3,109.94	14,448,863.88	1,700,080.43	39.78595674	-80.78761561
11,726.00	92.26	329.36	6,448.51	3,853.36	-3,155.20	14,448,941.65	1,700,035.18	39.78617059	-80.78777606
11,816.00	91.65	329.28	6,445.44	3,930.72	-3,201.10	14,449,019.00	1,699,989.28	39.78638333	-80.78793878
11,906.00	91.21	328.92	6,443.19	4,007.92	-3,247.30	14,449,096.20	1,699,943.08	39.78659565	-80.78810260
11,995.00	90.73	329.10	6,441.68	4,084.21	-3,293.12	14,449,172.49	1,699,897.26	39.78680545	-80.78826506
12,085.00	90.37	328.40	6,440.82	4,161.14	-3,339.81	14,449,249.43	1,699,850.57	39.78701704	-80.78843060
12,174.00	89.76	328.48	6,440.72	4,236.98	-3,386.39	14,449,325.26	1,699,803.99	39.78722561	-80.78859578
12,264.00	91.91	328.92	6,439.41	4,313.87	-3,433.14	14,449,402.15	1,699,757.24	39.78743707	-80.78876155
12,354.00	91.65	328.40	6,436.61	4,390.70	-3,479.93	14,449,478.98	1,699,710.45	39.78764837	-80.78892746
12,443.00	91.12	328.57	6,434.46	4,466.55	-3,526.43	14,449,554.83	1,699,663.94	39.78785698	-80.78909238
12,533.00	90.77	328.40	6,432.97	4,543.26	-3,573.47	14,449,631.55	1,699,616.91	39.78806797	-80.78925918
12,623.00	90.95	331.30	6,431.62	4,621.07	-3,618.67	14,449,709.35	1,699,571.71	39.78828194	-80.78941941
12,713.00	89.32	330.59	6,431.41	4,699.74	-3,662.37	14,449,788.02	1,699,528.00	39.78849827	-80.78957434
12,802.00	88.75	330.51	6,432.91	4,777.23	-3,706.12	14,449,865.51	1,699,484.25	39.78871136	-80.78972944
12,892.00	91.56	332.00	6,432.67	4,856.13	-3,749.40	14,449,944.41	1,699,440.98	39.78892831	-80.78988283
12,981.00	91.52	331.91	6,430.28	4,934.65	-3,791.23	14,450,022.93	1,699,399.15	39.78914422	-80.79003108
13,071.00	90.86	332.44	6,428.41	5,014.23	-3,833.23	14,450,102.51	1,699,357.15	39.78936303	-80.79017993
13,161.00	90.29	332.35	6,427.50	5,093.98	-3,874.93	14,450,182.26	1,699,315.45	39.78958232	-80.79032772
13,250.00	91.12	331.82	6,426.41	5,172.61	-3,916.59	14,450,260.90	1,699,273.78	39.78979854	-80.79047538
13,340.00	90.42	333.14	6,425.20	5,252.42	-3,958.17	14,450,340.70	1,699,232.20	39.79001798	-80.79062273
13,430.00	91.34	331.30	6,423.82	5,332.03	-4,000.11	14,450,420.32	1,699,190.26	39.79023689	-80.79077137
13,519.00	90.95	331.47	6,422.04	5,410.15	-4,042.73	14,450,498.43	1,699,147.65	39.79045169	-80.79092243
13,609.00	92.00	329.10	6,419.72	5,488.28	-4,087.32	14,450,576.56	1,699,103.06	39.79066655	-80.79108052
13,698.00	91.65	328.40	6,416.89	5,564.33	-4,133.47	14,450,652.61	1,699,056.91	39.79087569	-80.79124417
13,788.00	91.65	328.31	6,414.29	5,640.91	-4,180.67	14,450,729.20	1,699,009.71	39.79108632	-80.79141156

<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-03HM (slot N)
<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-03HM (slot N)	<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
13,878.00	91.25	327.78	6,412.02	5,717.25	-4,228.29	14,450,805.54	1,698,962.09	39.79129627	-80.79158044
13,967.00	90.20	329.80	6,410.89	5,793.36	-4,274.40	14,450,881.64	1,698,915.98	39.79150558	-80.79174396
14,057.00	89.63	329.80	6,411.02	5,871.14	-4,319.67	14,450,959.43	1,698,870.71	39.79171948	-80.79190449
14,147.00	89.19	329.98	6,411.95	5,949.00	-4,364.82	14,451,037.28	1,698,825.56	39.79193357	-80.79206456
14,237.00	91.38	329.89	6,411.50	6,026.88	-4,409.90	14,451,115.16	1,698,780.48	39.79214776	-80.79222442
14,326.00	91.30	330.15	6,409.42	6,103.95	-4,454.36	14,451,192.24	1,698,736.02	39.79235970	-80.79238207
14,416.00	90.77	330.59	6,407.80	6,182.17	-4,498.85	14,451,270.45	1,698,691.53	39.79257479	-80.79253980
14,506.00	90.07	330.86	6,407.14	6,260.67	-4,542.86	14,451,348.96	1,698,647.52	39.79279066	-80.79269582
14,596.00	91.21	330.51	6,406.13	6,339.14	-4,586.92	14,451,427.42	1,698,603.46	39.79300643	-80.79285204
14,685.00	91.03	330.24	6,404.39	6,416.49	-4,630.91	14,451,504.78	1,698,559.47	39.79321914	-80.79300799
14,775.00	90.24	330.07	6,403.39	6,494.55	-4,675.69	14,451,582.83	1,698,514.69	39.79343379	-80.79316679
14,865.00	91.96	329.54	6,401.67	6,572.32	-4,720.95	14,451,660.61	1,698,469.43	39.79364766	-80.79332726
14,954.00	91.52	329.19	6,398.96	6,648.86	-4,766.28	14,451,737.15	1,698,424.10	39.79385816	-80.79348801
15,044.00	91.03	329.36	6,396.96	6,726.21	-4,812.25	14,451,814.49	1,698,378.13	39.79407086	-80.79365103
15,134.00	90.64	329.28	6,395.65	6,803.61	-4,858.16	14,451,891.89	1,698,332.21	39.79428370	-80.79381387
15,223.00	90.59	329.89	6,394.70	6,880.35	-4,903.22	14,451,968.64	1,698,287.16	39.79449475	-80.79397364
15,313.00	89.98	329.19	6,394.25	6,957.93	-4,948.84	14,452,046.21	1,698,241.54	39.79470809	-80.79413542
15,403.00	89.58	329.36	6,394.59	7,035.30	-4,994.82	14,452,123.58	1,698,195.55	39.79492085	-80.79429849
15,492.00	90.86	329.89	6,394.25	7,112.08	-5,039.83	14,452,200.36	1,698,150.55	39.79513199	-80.79445808
15,582.00	92.04	329.28	6,391.97	7,189.66	-5,085.37	14,452,277.95	1,698,105.00	39.79534536	-80.79461960
15,672.00	91.74	329.80	6,389.01	7,267.20	-5,130.97	14,452,355.48	1,698,059.40	39.79555858	-80.79478131
15,761.00	91.38	328.84	6,386.58	7,343.71	-5,176.37	14,452,432.00	1,698,014.01	39.79576899	-80.79494230
15,851.00	91.52	328.66	6,384.31	7,420.63	-5,223.04	14,452,508.91	1,697,967.34	39.79598052	-80.79510784
15,941.00	92.09	328.66	6,381.47	7,497.46	-5,269.83	14,452,585.74	1,697,920.55	39.79619181	-80.79527378
16,030.00	90.59	329.80	6,379.39	7,573.91	-5,315.35	14,452,662.19	1,697,875.03	39.79640204	-80.79543521
16,120.00	91.34	329.63	6,377.87	7,651.61	-5,360.73	14,452,739.90	1,697,829.65	39.79661573	-80.79559614
16,209.00	92.00	329.80	6,375.28	7,728.43	-5,405.59	14,452,816.72	1,697,784.79	39.79682698	-80.79575524
16,299.00	89.85	330.68	6,373.83	7,806.55	-5,450.25	14,452,894.83	1,697,740.12	39.79704178	-80.79591362
16,389.00	90.07	330.33	6,373.89	7,884.89	-5,494.57	14,452,973.17	1,697,695.81	39.79725719	-80.79607075
16,478.00	91.03	330.51	6,373.04	7,962.28	-5,538.50	14,453,050.56	1,697,651.88	39.79747002	-80.79622652
16,568.00	88.70	331.21	6,373.25	8,040.88	-5,582.32	14,453,129.17	1,697,608.06	39.79768616	-80.79638190
16,658.00	89.36	330.86	6,374.77	8,119.61	-5,625.90	14,453,207.90	1,697,564.48	39.79790264	-80.79653642
16,747.00	90.29	330.95	6,375.04	8,197.38	-5,669.17	14,453,285.67	1,697,521.20	39.79811649	-80.79668986
16,837.00	92.09	332.00	6,373.17	8,276.44	-5,712.14	14,453,364.72	1,697,478.24	39.79833386	-80.79684220
16,927.00	91.03	331.03	6,370.72	8,355.51	-5,755.05	14,453,443.79	1,697,435.33	39.79855128	-80.79699432
17,017.00	91.34	331.30	6,368.86	8,434.33	-5,798.44	14,453,522.62	1,697,391.93	39.79876802	-80.79714819
17,106.00	92.44	331.03	6,365.93	8,512.25	-5,841.34	14,453,600.54	1,697,349.03	39.79898228	-80.79730030
17,196.00	93.32	331.47	6,361.40	8,591.06	-5,884.58	14,453,679.34	1,697,305.80	39.79919897	-80.79745360
17,286.00	94.20	331.65	6,355.50	8,670.03	-5,927.35	14,453,758.31	1,697,263.03	39.79941610	-80.79760523
17,336.00	94.64	331.12	6,351.65	8,713.79	-5,951.22	14,453,802.07	1,697,239.16	39.79953643	-80.79768988
<b>Survey @ 17336.00 MD 6351.65 TVD</b>									
17,393.00	94.64	331.12	6,347.04	8,763.54	-5,978.66	14,453,851.82	1,697,211.72	39.79967322	-80.79778718
<b>Survey projected to 17393.00 MD 6347.04 TVD</b>									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
241.00	241.00	-0.66	0.48	MWD surveys	
17,336.00	6,351.65	8,713.79	-5,951.22	Survey @ 17336.00 MD 6351.65 TVD	
17,393.00	6,347.04	8,763.54	-5,978.66	Survey projected to 17393.00 MD 6347.04 TVD	

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