



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan N-07HM (Slot A)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan N-07HM (Slot A)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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	Bryan Pad				
Site Position:		Northing:	14,445,110.80 usft	Latitude:	39.77562900
From:	Lat/Long	Easting:	1,703,181.57 usft	Longitude:	-80.77660992
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.14 °

Well	Bryan N-07HM (Slot A)					
Well Position	+N/-S	0.00 usft	Northing:	14,445,154.15 usft	Latitude:	39.77574797
	+E/-W	0.00 usft	Easting:	1,703,192.93 usft	Longitude:	-80.77656912
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,191.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2/12/2019	-8.69	66.82	51,984.87671991

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:		Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
		0.00	0.00	0.00	342.43

Survey Program	Date	3/7/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
269.00	2,871.00	MWD surf (Original Hole)	MWD	MWD - Standard
2,961.00	20,749.96	MWD (Original Hole)	MWD	MWD - Standard
20,806.00	20,806.00	Projection (Original Hole)	MWD	MWD - Standard

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Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912	
269.00	0.48	316.34	269.00	0.82	-0.78	14,445,154.96	1,703,192.15	39.77575022	-80.77657188	
MWD surveys										
300.00	0.19	355.31	300.00	0.96	-0.87	14,445,155.11	1,703,192.06	39.77575062	-80.77657222	
332.00	0.23	176.23	332.00	0.95	-0.87	14,445,155.10	1,703,192.06	39.77575058	-80.77657222	
395.00	0.25	47.95	395.00	0.92	-0.76	14,445,155.06	1,703,192.17	39.77575049	-80.77657182	
458.00	0.36	279.04	458.00	1.04	-0.85	14,445,155.18	1,703,192.08	39.77575083	-80.77657215	
520.00	0.42	343.30	519.99	1.29	-1.11	14,445,155.43	1,703,191.82	39.77575151	-80.77657307	
614.00	0.28	6.93	613.99	1.84	-1.18	14,445,155.99	1,703,191.75	39.77575305	-80.77657332	
709.00	0.62	239.53	708.99	1.81	-1.60	14,445,155.96	1,703,191.33	39.77575297	-80.77657480	

WV Department of Environmental Protection



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Well:	Bryan N-07HM (Slot A)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	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
803.00	0.05	58.79	802.99	1.58	-2.00	14,445,155.72	1,703,190.93	39.77575232	-80.77657623
957.00	0.45	84.36	956.99	1.67	-1.34	14,445,155.82	1,703,191.59	39.77575257	-80.77657389
1,073.00	1.24	77.93	1,072.97	1.98	0.34	14,445,156.13	1,703,193.27	39.77575340	-80.77656790
1,162.00	1.49	80.06	1,161.95	2.38	2.42	14,445,156.53	1,703,195.35	39.77575449	-80.77656049
1,252.00	2.00	64.80	1,251.91	3.25	4.99	14,445,157.40	1,703,197.92	39.77575687	-80.77655132
1,342.00	3.24	50.62	1,341.81	5.53	8.38	14,445,159.68	1,703,201.31	39.77576311	-80.77653925
1,432.00	3.98	47.57	1,431.63	9.25	12.65	14,445,163.40	1,703,205.58	39.77577330	-80.77652401
1,521.00	4.74	53.98	1,520.38	13.50	17.91	14,445,167.65	1,703,210.84	39.77578493	-80.77650527
1,611.00	5.70	57.72	1,610.00	18.07	24.69	14,445,172.22	1,703,217.62	39.77579744	-80.77648108
1,701.00	7.22	62.51	1,699.43	23.07	33.49	14,445,177.22	1,703,226.42	39.77581111	-80.77644973
1,790.00	8.51	67.23	1,787.59	28.20	44.52	14,445,182.35	1,703,237.45	39.77582512	-80.77641041
1,880.00	11.08	64.61	1,876.27	34.49	58.48	14,445,188.64	1,703,251.41	39.77584229	-80.77636069
1,970.00	14.34	65.10	1,964.05	42.89	76.40	14,445,197.04	1,703,269.33	39.77586524	-80.77629681
2,060.00	17.07	68.24	2,050.69	52.48	98.79	14,445,206.63	1,703,291.72	39.77589143	-80.77621706
2,149.00	13.90	72.72	2,138.45	60.50	121.13	14,445,214.65	1,703,314.06	39.77591330	-80.77613746
2,239.00	11.48	73.91	2,224.24	66.20	140.06	14,445,220.34	1,703,332.99	39.77592881	-80.77607003
2,328.00	11.28	72.84	2,311.49	71.22	156.89	14,445,225.37	1,703,349.82	39.77594249	-80.77601010
2,418.00	9.99	76.75	2,399.95	75.61	172.90	14,445,229.75	1,703,365.83	39.77595442	-80.77595308
2,507.00	9.41	71.56	2,487.68	79.68	187.32	14,445,233.82	1,703,380.25	39.77596551	-80.77590173
2,597.00	9.72	63.18	2,576.43	85.43	201.08	14,445,239.58	1,703,394.01	39.77598122	-80.77585270
2,643.00	10.09	60.13	2,621.74	89.19	208.04	14,445,243.34	1,703,400.97	39.77599149	-80.77582790
2,692.00	9.81	58.18	2,670.01	93.53	215.31	14,445,247.68	1,703,408.24	39.77600336	-80.77580199
2,782.00	11.40	52.01	2,758.47	103.05	228.83	14,445,257.20	1,703,421.76	39.77602940	-80.77575376
2,871.00	15.47	49.49	2,845.02	116.18	244.79	14,445,270.33	1,703,437.72	39.77606535	-80.77569683
2,960.99	20.72	57.89	2,930.54	132.45	267.42	14,445,286.60	1,703,460.35	39.77610989	-80.77561614
3,050.99	21.49	78.30	3,014.62	144.27	297.09	14,445,298.42	1,703,490.02	39.77614215	-80.77551044
3,140.99	20.27	76.41	3,098.71	151.28	328.39	14,445,305.43	1,703,521.32	39.77616118	-80.77539898
3,229.99	16.97	76.94	3,183.04	157.84	356.04	14,445,311.99	1,703,548.97	39.77617900	-80.77530053
3,319.99	15.66	76.28	3,269.41	163.69	380.63	14,445,317.84	1,703,573.56	39.77619489	-80.77521294
3,408.99	15.43	69.28	3,355.17	170.73	403.38	14,445,324.87	1,703,596.31	39.77621407	-80.77513192
3,498.99	17.92	69.16	3,441.37	179.89	427.52	14,445,334.04	1,703,620.45	39.77623906	-80.77504591
3,588.99	23.74	71.19	3,525.46	190.67	457.63	14,445,344.81	1,703,650.56	39.77626845	-80.77493863
3,678.99	28.86	76.17	3,606.12	201.71	495.90	14,445,355.86	1,703,688.83	39.77629851	-80.77480233
3,767.99	30.44	70.40	3,683.48	214.41	538.01	14,445,368.56	1,703,730.94	39.77633310	-80.77465235
3,857.99	31.87	70.85	3,760.50	229.85	581.94	14,445,384.00	1,703,774.87	39.77637521	-80.77449588
3,946.99	33.45	74.57	3,835.43	244.09	627.78	14,445,398.24	1,703,820.71	39.77641399	-80.77433257
4,036.99	29.14	72.88	3,912.32	257.15	672.66	14,445,411.29	1,703,865.59	39.77644953	-80.77417274
4,126.99	28.19	68.65	3,991.30	271.34	713.40	14,445,425.48	1,703,906.33	39.77648822	-80.77402759
4,215.99	29.68	65.20	4,069.19	288.23	752.99	14,445,442.38	1,703,945.92	39.77653435	-80.77388654
4,305.99	32.71	65.32	4,146.17	307.74	795.32	14,445,461.89	1,703,988.25	39.77658763	-80.77373570
4,395.99	36.94	68.32	4,220.04	327.89	842.57	14,445,482.04	1,704,035.50	39.77664265	-80.77356734
4,484.99	41.33	70.53	4,289.06	347.58	895.16	14,445,501.73	1,704,088.09	39.77669634	-80.77337999
4,574.99	42.18	67.80	4,356.20	368.90	951.16	14,445,523.05	1,704,144.09	39.77675452	-80.77318049
4,664.99	42.63	68.60	4,422.66	391.44	1,007.51	14,445,545.59	1,704,200.44	39.77681602	-80.77297971
4,753.99	42.11	66.44	4,488.42	414.37	1,062.93	14,445,568.51	1,704,255.86	39.77687859	-80.77278227
4,843.99	44.36	66.14	4,553.98	439.16	1,119.37	14,445,593.30	1,704,312.30	39.77694628	-80.77258117
4,932.99	44.76	68.78	4,617.40	463.09	1,177.04	14,445,617.23	1,704,369.97	39.77701159	-80.77237570
5,022.99	42.84	69.92	4,682.36	485.06	1,235.32	14,445,639.21	1,704,428.25	39.77707154	-80.77216806
5,112.99	42.11	72.99	4,748.75	504.40	1,292.92	14,445,658.54	1,704,485.85	39.77712424	-80.77196287
5,201.99	40.04	71.45	4,815.84	522.24	1,348.60	14,445,676.38	1,704,541.53	39.77717284	-80.77176453
5,291.99	41.11	69.85	4,884.20	541.64	1,403.83	14,445,695.79	1,704,596.76	39.77722574	-80.77156779
5,380.99	42.06	71.30	4,950.77	561.28	1,459.54	14,445,715.42	1,704,652.47	39.77727928	-80.77136934
5,470.99	40.80	69.62	5,018.25	581.18	1,515.66	14,445,735.33	1,704,708.59	39.77733355	-80.77116941
5,560.99	41.84	67.87	5,085.84	602.73	1,571.03	14,445,756.88	1,704,763.96	39.77739234	-80.77097213
5,649.99	42.44	69.74	5,151.84	624.31	1,626.70	14,445,778.46	1,704,819.63	39.77745122	-80.77077379



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5,739.99	40.30	68.47	5,219.38	645.51	1,682.27	14,445,799.66	1,704,875.20	39.77750905	-80.77057581
5,829.99	39.67	68.93	5,288.33	666.52	1,736.15	14,445,820.67	1,704,929.08	39.77756637	-80.77038384
5,918.99	40.27	71.20	5,356.55	686.01	1,789.89	14,445,840.15	1,704,982.82	39.77761950	-80.77019238
6,008.99	39.22	72.81	5,425.75	703.79	1,844.61	14,445,857.94	1,705,037.54	39.77766795	-80.76999746
6,098.99	38.10	66.53	5,496.05	723.27	1,897.29	14,445,877.41	1,705,090.22	39.77772107	-80.76980980
6,187.99	39.42	63.74	5,565.46	746.71	1,947.82	14,445,900.85	1,705,140.75	39.77778509	-80.76962972
6,277.99	40.23	69.45	5,634.60	769.56	2,000.68	14,445,923.71	1,705,193.61	39.77784747	-80.76944138
6,367.99	41.22	74.31	5,702.82	787.79	2,056.46	14,445,941.93	1,705,249.39	39.77789713	-80.76924268
6,457.99	39.08	73.86	5,771.61	803.69	2,112.26	14,445,957.84	1,705,305.19	39.77794042	-80.76904392
6,546.99	37.31	68.63	5,841.57	821.33	2,164.35	14,445,975.47	1,705,357.28	39.77798848	-80.76885838
6,614.99	36.22	64.12	5,896.06	837.61	2,201.62	14,445,991.76	1,705,394.55	39.77803293	-80.76872556
6,704.99	35.16	58.58	5,969.17	862.73	2,247.67	14,446,016.88	1,705,440.60	39.77810159	-80.76856142
6,749.99	35.38	48.56	6,005.94	878.12	2,268.51	14,446,032.27	1,705,461.44	39.77814371	-80.76848710
6,794.99	34.81	41.62	6,042.77	896.35	2,286.82	14,446,050.50	1,705,479.75	39.77819365	-80.76842178
6,839.99	36.92	36.17	6,079.25	916.87	2,303.33	14,446,071.02	1,705,496.26	39.77824989	-80.76836282
6,883.99	39.74	31.07	6,113.77	939.60	2,318.40	14,446,093.74	1,705,511.33	39.77831219	-80.76830899
6,928.99	43.30	26.41	6,147.47	965.75	2,332.69	14,446,119.90	1,705,525.62	39.77838392	-80.76825787
6,973.99	46.73	24.92	6,179.27	994.44	2,346.46	14,446,148.59	1,705,539.39	39.77846261	-80.76820859
7,018.99	46.46	24.57	6,210.20	1,024.13	2,360.15	14,446,178.28	1,705,553.08	39.77854405	-80.76815960
7,063.99	50.46	23.07	6,240.03	1,054.94	2,373.73	14,446,209.09	1,705,566.66	39.77862857	-80.76811096
7,108.99	51.69	22.81	6,268.30	1,087.18	2,387.38	14,446,241.33	1,705,580.31	39.77871701	-80.76806210
7,153.99	52.13	22.46	6,296.07	1,119.87	2,401.01	14,446,274.02	1,705,593.94	39.77880668	-80.76801328
7,197.99	54.11	22.37	6,322.47	1,152.41	2,414.43	14,446,306.55	1,705,607.36	39.77889594	-80.76796522
7,242.99	56.88	20.44	6,347.96	1,186.93	2,427.95	14,446,341.08	1,705,620.88	39.77899065	-80.76791677
7,287.99	58.86	15.16	6,371.90	1,223.20	2,439.57	14,446,377.34	1,705,632.50	39.77909017	-80.76787507
7,332.99	60.13	10.51	6,394.76	1,260.99	2,448.17	14,446,415.13	1,705,641.10	39.77919388	-80.76784411
7,377.99	61.01	8.48	6,416.87	1,299.64	2,454.63	14,446,453.78	1,705,647.56	39.77929999	-80.76782075
7,422.99	61.89	3.30	6,438.39	1,338.94	2,458.68	14,446,493.08	1,705,651.61	39.77940789	-80.76780599
7,466.99	64.04	357.67	6,458.40	1,378.10	2,458.99	14,446,532.25	1,705,651.92	39.77951545	-80.76780451
7,511.99	67.52	353.28	6,476.86	1,418.99	2,455.74	14,446,573.14	1,705,648.67	39.77962777	-80.76781573
7,556.99	70.81	350.29	6,492.87	1,460.61	2,449.72	14,446,614.75	1,705,642.65	39.77974209	-80.76783677
7,601.98	73.76	345.90	6,506.57	1,502.53	2,440.86	14,446,656.68	1,705,633.79	39.77985729	-80.76786789
7,691.98	82.37	338.95	6,525.18	1,586.31	2,414.24	14,446,740.46	1,705,607.17	39.78008757	-80.76796189
7,736.98	86.64	335.88	6,529.49	1,627.66	2,397.04	14,446,781.80	1,705,589.97	39.78020123	-80.76802274
7,781.98	87.25	333.15	6,531.89	1,668.22	2,377.70	14,446,822.36	1,705,570.63	39.78031275	-80.76809118
7,870.98	89.10	327.97	6,534.73	1,745.65	2,334.00	14,446,899.80	1,705,526.93	39.78052573	-80.76824603
7,960.98	90.15	327.44	6,535.32	1,821.73	2,285.91	14,446,975.87	1,705,478.84	39.78073499	-80.76841648
8,050.98	92.79	328.49	6,533.01	1,897.99	2,238.19	14,447,052.14	1,705,431.12	39.78094477	-80.76858563
8,139.98	91.96	330.52	6,529.32	1,974.61	2,193.07	14,447,128.75	1,705,386.00	39.78115550	-80.76874553
8,229.98	91.21	329.99	6,526.83	2,052.72	2,148.44	14,447,206.87	1,705,341.37	39.78137033	-80.76890369
8,319.98	89.45	329.72	6,526.31	2,130.54	2,103.24	14,447,284.69	1,705,296.17	39.78158438	-80.76906384
8,408.98	89.19	329.81	6,527.37	2,207.43	2,058.43	14,447,361.58	1,705,251.36	39.78179585	-80.76922264
8,498.98	88.88	329.64	6,528.88	2,285.14	2,013.06	14,447,439.29	1,705,205.99	39.78200959	-80.76938341
8,587.98	91.12	328.58	6,528.88	2,361.51	1,967.37	14,447,515.66	1,705,160.31	39.78221965	-80.76954534
8,677.98	91.21	328.14	6,527.05	2,438.12	1,920.17	14,447,592.27	1,705,113.10	39.78243037	-80.76971265
8,767.98	90.59	328.76	6,525.64	2,514.81	1,873.09	14,447,668.95	1,705,066.02	39.78264130	-80.76987955
8,856.98	92.48	329.55	6,523.26	2,591.19	1,827.47	14,447,745.33	1,705,020.40	39.78285138	-80.77004121
8,946.98	92.97	332.01	6,518.98	2,669.64	1,783.59	14,447,823.78	1,704,976.52	39.78306714	-80.77019669
9,036.98	91.25	332.80	6,515.66	2,749.34	1,741.93	14,447,903.49	1,704,934.86	39.78328632	-80.77034425
9,066.98	91.43	332.89	6,514.96	2,776.03	1,728.24	14,447,930.17	1,704,921.17	39.78359771	-80.77049273
9,126.98	89.63	332.71	6,514.41	2,829.39	1,700.82	14,447,983.54	1,704,893.75	39.78350644	-80.77048986
9,170.98	88.57	332.36	6,515.10	2,868.42	1,680.53	14,448,022.57	1,704,873.46	39.78361379	-80.77056173
9,215.98	88.48	332.36	6,516.26	2,908.28	1,659.66	14,448,062.42	1,704,852.59	39.78372338	-80.77063565
9,305.98	87.78	331.22	6,519.19	2,987.54	1,617.14	14,448,141.69	1,704,810.07	39.78394136	-80.77078627
9,395.98	88.40	329.81	6,522.19	3,065.84	1,572.87	14,448,219.99	1,704,765.80	39.78415670	-80.77094315



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan N-07HM (Slot A)
Project:	Marshall County, West Virginia.	VTD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan N-07HM (Slot A)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	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
9,484.98	90.64	327.79	6,522.94	3,141.95	1,526.77	14,448,296.10	1,704,719.70	39.78436606	-80.77110654
9,574.98	90.59	327.26	6,521.97	3,217.88	1,478.45	14,448,372.02	1,704,671.38	39.78457490	-80.77127786
9,663.98	93.71	326.12	6,518.63	3,292.19	1,429.62	14,448,446.34	1,704,622.55	39.78477933	-80.77145101
9,753.98	92.40	328.67	6,513.84	3,367.89	1,381.20	14,448,522.04	1,704,574.13	39.78498757	-80.77162268
9,843.98	91.03	330.87	6,511.14	3,445.61	1,335.91	14,448,599.76	1,704,528.84	39.78520132	-80.77179318
9,932.98	90.99	330.60	6,509.57	3,523.24	1,292.41	14,448,677.39	1,704,485.34	39.78541482	-80.77193732
10,022.98	89.89	331.13	6,508.88	3,601.85	1,248.59	14,448,756.00	1,704,441.52	39.78563101	-80.77209258
10,112.98	89.85	331.22	6,509.09	3,680.70	1,205.20	14,448,834.84	1,704,398.13	39.78584785	-80.77224633
10,201.98	89.54	331.31	6,509.56	3,758.74	1,162.41	14,448,912.88	1,704,355.34	39.78606246	-80.77239793
10,291.98	89.10	330.96	6,510.63	3,837.55	1,118.97	14,448,991.70	1,704,311.90	39.78627921	-80.77255186
10,381.98	90.59	331.22	6,510.87	3,916.33	1,075.46	14,449,070.48	1,704,268.39	39.78649586	-80.77270602
10,471.98	90.73	331.83	6,509.84	3,995.44	1,032.56	14,449,149.58	1,704,225.49	39.78671341	-80.77285804
10,560.98	90.64	332.10	6,508.77	4,073.99	990.73	14,449,228.13	1,704,183.66	39.78692942	-80.77300623
10,650.98	90.73	332.54	6,507.70	4,153.68	948.92	14,449,307.83	1,704,141.85	39.78714858	-80.77315432
10,739.98	89.54	330.60	6,507.49	4,231.94	906.55	14,449,386.09	1,704,099.48	39.78736380	-80.77330444
10,829.98	89.19	330.43	6,508.48	4,310.28	862.26	14,449,464.43	1,704,055.19	39.78757924	-80.77346141
10,919.98	90.64	329.11	6,508.62	4,388.04	816.95	14,449,542.19	1,704,009.88	39.78779310	-80.77362200
11,009.98	90.02	326.21	6,508.10	4,464.07	768.81	14,449,618.22	1,703,961.74	39.78800223	-80.77379268
11,098.98	91.60	327.26	6,506.84	4,538.47	720.00	14,449,692.62	1,703,912.93	39.78820691	-80.77396577
11,188.98	92.00	326.91	6,504.01	4,613.99	671.12	14,449,768.14	1,703,864.05	39.78841464	-80.77413909
11,278.98	91.78	329.64	6,501.04	4,690.49	623.82	14,449,844.64	1,703,816.75	39.78862506	-80.77430677
11,322.98	91.91	329.46	6,499.63	4,728.40	601.54	14,449,882.55	1,703,794.47	39.78872933	-80.77438576
11,367.98	92.09	329.02	6,498.06	4,767.05	578.54	14,449,921.20	1,703,771.47	39.78883562	-80.77446730
11,412.98	90.90	330.60	6,496.88	4,805.93	555.92	14,449,960.08	1,703,748.85	39.78894256	-80.77454747
11,457.98	91.03	330.08	6,496.12	4,845.03	533.65	14,449,999.18	1,703,726.58	39.78905009	-80.77462638
11,546.98	89.19	331.13	6,495.95	4,922.57	489.97	14,450,076.71	1,703,682.90	39.78926333	-80.77478118
11,636.98	88.97	330.87	6,497.40	5,001.27	446.34	14,450,155.42	1,703,639.27	39.78947977	-80.77493578
11,726.98	91.91	331.31	6,496.71	5,080.04	402.84	14,450,234.19	1,703,595.77	39.78969640	-80.77508994
11,816.98	90.99	331.39	6,494.43	5,159.00	359.70	14,450,313.15	1,703,552.63	39.78991353	-80.77524280
11,905.98	90.68	331.04	6,493.13	5,236.99	316.85	14,450,391.14	1,703,509.78	39.79012802	-80.77539464
11,995.98	90.42	330.96	6,492.27	5,315.71	273.22	14,450,469.85	1,703,466.15	39.79034449	-80.77554926
12,085.98	90.20	331.04	6,491.78	5,394.42	229.59	14,450,548.57	1,703,422.52	39.79056096	-80.77570389
12,174.98	89.93	331.48	6,491.68	5,472.46	186.80	14,450,626.60	1,703,379.73	39.79077556	-80.77585553
12,264.98	90.90	331.31	6,491.03	5,551.47	143.71	14,450,705.61	1,703,336.64	39.79099284	-80.77600822
12,354.98	91.08	330.96	6,489.47	5,630.27	100.27	14,450,784.42	1,703,293.20	39.79120956	-80.77616216
12,443.98	90.81	331.31	6,488.01	5,708.20	57.31	14,450,862.35	1,703,250.24	39.79142388	-80.77631440
12,533.98	90.73	331.75	6,486.80	5,787.31	14.41	14,450,941.46	1,703,207.34	39.79164143	-80.77646641
12,623.98	90.46	331.57	6,485.86	5,866.52	-28.31	14,451,020.67	1,703,164.62	39.79185925	-80.77661779
12,712.97	90.59	329.72	6,485.05	5,944.09	-71.94	14,451,098.23	1,703,120.99	39.79207256	-80.77677241
12,802.97	90.73	329.64	6,484.01	6,021.77	-117.37	14,451,175.92	1,703,075.56	39.79228622	-80.77693345
12,891.97	91.16	329.64	6,482.54	6,098.56	-162.34	14,451,252.70	1,703,030.59	39.79249740	-80.77709289
12,981.97	91.16	329.81	6,480.72	6,176.27	-207.71	14,451,330.41	1,702,985.22	39.79271112	-80.77725370
13,071.97	91.38	329.46	6,478.73	6,253.90	-253.19	14,451,408.05	1,702,939.74	39.79292463	-80.77741494
13,161.97	91.43	329.37	6,476.52	6,331.36	-298.97	14,451,485.50	1,702,893.96	39.79313766	-80.77757723
13,250.97	91.34	329.72	6,474.37	6,408.05	-344.07	14,451,562.20	1,702,848.86	39.79334860	-80.77773710
13,340.97	90.90	329.64	6,472.61	6,485.73	-389.50	14,451,639.87	1,702,803.43	39.79356222	-80.77789813
13,429.97	90.68	329.20	6,471.38	6,562.34	-434.77	14,451,716.49	1,702,758.16	39.79377294	-80.77805863
13,519.97	90.46	328.67	6,470.49	6,639.43	-481.21	14,451,793.58	1,702,711.72	39.79398496	-80.77822327
13,608.97	90.24	328.76	6,469.94	6,715.49	-527.42	14,451,869.63	1,702,665.51	39.79419414	-80.77838714
13,698.97	90.07	328.93	6,469.70	6,792.51	-573.99	14,451,946.65	1,702,618.94	39.79440598	-80.77855222
13,788.97	90.86	329.90	6,468.97	6,869.98	-619.78	14,452,024.13	1,702,573.15	39.79461905	-80.77871456
13,877.97	91.12	329.72	6,467.43	6,946.90	-664.52	14,452,101.04	1,702,528.41	39.79483059	-80.77887319
13,967.97	90.73	329.29	6,465.98	7,024.44	-710.19	14,452,178.58	1,702,482.74	39.79504385	-80.77903509
14,057.97	91.08	329.37	6,464.56	7,101.84	-756.09	14,452,255.98	1,702,436.84	39.79525672	-80.77919783
14,147.97	90.73	328.85	6,463.14	7,179.06	-802.29	14,452,333.21	1,702,390.64	39.79546911	-80.77936162

WV Department of Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan N-07HM (Slot A)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan N-07HM (Slot A)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	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
14,236.97	91.91	329.99	6,461.09	7,255.66	-847.56	14,452,409.81	1,702,345.37	39.79567978	-80.77952210
14,326.97	92.84	330.96	6,457.36	7,333.90	-891.87	14,452,488.05	1,702,301.06	39.79589495	-80.77967918
14,416.97	92.09	331.75	6,453.48	7,412.81	-934.97	14,452,566.96	1,702,257.96	39.79611195	-80.77983194
14,506.97	91.74	332.45	6,450.48	7,492.31	-977.06	14,452,646.45	1,702,215.87	39.79633055	-80.77998109
14,595.97	90.59	331.66	6,448.67	7,570.91	-1,018.76	14,452,725.06	1,702,174.17	39.79654670	-80.78012886
14,685.97	90.24	332.10	6,448.02	7,650.29	-1,061.18	14,452,804.43	1,702,131.75	39.79676497	-80.78027918
14,775.97	89.58	331.92	6,448.16	7,729.76	-1,103.42	14,452,883.90	1,702,089.51	39.79698350	-80.78042886
14,864.97	89.05	332.01	6,449.22	7,808.31	-1,145.24	14,452,962.45	1,702,047.69	39.79719951	-80.78057709
14,954.97	88.79	329.55	6,450.92	7,886.84	-1,189.17	14,453,040.98	1,702,003.76	39.79847194	-80.78155626
15,044.97	89.80	329.72	6,452.03	7,964.48	-1,234.66	14,453,118.63	1,701,958.27	39.79762901	-80.78089407
15,133.97	91.82	328.76	6,450.77	8,040.95	-1,280.17	14,453,195.10	1,701,912.76	39.79783931	-80.78105544
15,223.97	91.56	328.49	6,448.11	8,117.76	-1,327.01	14,453,271.90	1,701,865.92	39.79805055	-80.78122152
15,313.97	91.34	328.32	6,445.84	8,194.39	-1,374.14	14,453,348.54	1,701,818.79	39.79826133	-80.78138867
15,403.97	90.86	328.32	6,444.11	8,270.97	-1,421.40	14,453,425.11	1,701,771.53	39.79847194	-80.78155626
15,453.97	90.77	328.49	6,443.40	8,313.55	-1,447.59	14,453,467.70	1,701,745.34	39.79858907	-80.78164914
15,492.97	90.46	329.11	6,442.98	8,346.91	-1,467.79	14,453,501.05	1,701,725.14	39.79868081	-80.78172078
15,582.97	89.85	330.43	6,442.73	8,424.67	-1,513.11	14,453,578.81	1,701,679.82	39.79889466	-80.78188142
15,671.97	89.58	330.60	6,443.18	8,502.14	-1,556.91	14,453,656.28	1,701,636.02	39.79910771	-80.78203671
15,761.97	90.15	330.16	6,443.39	8,580.38	-1,601.39	14,453,734.52	1,701,591.54	39.79932287	-80.78219440
15,851.97	91.03	330.43	6,442.46	8,658.54	-1,645.99	14,453,812.69	1,701,546.94	39.79953784	-80.78235250
15,941.97	90.68	330.08	6,441.12	8,736.68	-1,690.63	14,453,890.82	1,701,502.30	39.79975271	-80.78251079
16,030.97	90.95	330.43	6,439.85	8,813.94	-1,734.79	14,453,968.09	1,701,458.14	39.79996519	-80.78266732
16,120.97	90.51	330.34	6,438.71	8,892.18	-1,779.26	14,454,046.32	1,701,413.67	39.80018035	-80.78282498
16,209.97	91.43	329.72	6,437.20	8,969.26	-1,823.71	14,454,123.41	1,701,369.22	39.80039235	-80.78298258
16,299.97	91.30	329.55	6,435.06	9,046.90	-1,869.19	14,454,201.04	1,701,323.74	39.80060585	-80.78314385
16,389.97	91.12	329.64	6,433.16	9,124.50	-1,914.73	14,454,278.65	1,701,278.20	39.80081927	-80.78330532
16,478.97	91.38	330.69	6,431.21	9,201.69	-1,959.00	14,454,355.83	1,701,233.93	39.80103154	-80.78346226
16,568.97	90.77	329.72	6,429.53	9,279.77	-2,003.71	14,454,433.92	1,701,189.22	39.80124628	-80.78362078
16,658.97	90.24	329.11	6,428.73	9,357.25	-2,049.50	14,454,511.39	1,701,143.43	39.80145935	-80.78378315
16,747.97	91.43	330.43	6,427.44	9,434.13	-2,094.31	14,454,588.28	1,701,098.62	39.80167080	-80.78394201
16,837.97	90.86	330.25	6,425.64	9,512.33	-2,138.83	14,454,666.47	1,701,054.10	39.80188583	-80.78409988
16,927.97	90.73	329.90	6,424.39	9,590.32	-2,183.73	14,454,744.47	1,701,009.20	39.80210032	-80.78425905
17,017.97	90.68	329.64	6,423.28	9,668.07	-2,229.04	14,454,822.22	1,700,963.89	39.80231415	-80.78441971
17,106.97	91.08	330.78	6,421.91	9,745.30	-2,273.25	14,454,899.45	1,700,919.68	39.80252654	-80.78457646
17,196.97	91.21	330.87	6,420.12	9,823.87	-2,317.11	14,454,978.01	1,700,875.82	39.80274259	-80.78473197
17,286.97	91.08	331.22	6,418.32	9,902.60	-2,360.67	14,455,056.75	1,700,832.26	39.80295910	-80.78488640
17,375.97	90.51	331.39	6,417.08	9,980.66	-2,403.40	14,455,134.81	1,700,789.53	39.80317376	-80.78503787
17,465.97	90.29	331.92	6,416.45	10,059.87	-2,446.13	14,455,214.02	1,700,746.80	39.80339157	-80.78518933
17,555.97	89.89	332.19	6,416.31	10,139.38	-2,488.31	14,455,293.52	1,700,704.62	39.80361019	-80.78533882
17,645.97	90.46	331.22	6,416.04	10,218.62	-2,530.97	14,455,372.77	1,700,661.96	39.80382810	-80.78549004
17,734.96	90.51	331.83	6,415.28	10,296.85	-2,573.40	14,455,451.00	1,700,619.53	39.80404322	-80.78564045
17,824.96	90.24	329.29	6,414.69	10,375.22	-2,617.63	14,455,529.37	1,700,575.30	39.80425873	-80.78579727
17,914.96	89.85	329.11	6,414.62	10,452.53	-2,663.71	14,455,606.67	1,700,529.22	39.80447134	-80.78596070
18,003.96	91.16	328.87	6,413.84	10,528.72	-2,709.69	14,455,682.87	1,700,483.24	39.80468089	-80.78612377
18,093.96	90.73	327.97	6,412.36	10,605.30	-2,756.95	14,455,759.45	1,700,435.98	39.80489151	-80.78629139
18,183.96	90.24	327.09	6,411.59	10,681.23	-2,805.27	14,455,835.37	1,700,387.66	39.80510034	-80.78646278
18,273.96	91.52	328.49	6,410.21	10,757.36	-2,853.23	14,455,911.51	1,700,339.70	39.80530974	-80.78663292
18,362.96	91.56	329.29	6,407.82	10,833.53	-2,899.20	14,455,987.68	1,700,293.73	39.80551923	-80.78679595
18,452.96	91.34	329.37	6,405.54	10,910.92	-2,945.09	14,456,065.07	1,700,247.84	39.80573205	-80.78695870
18,542.96	91.52	331.75	6,403.30	10,989.27	-2,989.31	14,456,143.41	1,700,203.62	39.80594751	-80.78711549
18,631.96	90.81	332.27	6,401.49	11,067.84	-3,031.07	14,456,221.99	1,700,161.86	39.80616356	-80.78726352
18,720.96	90.46	332.19	6,400.50	11,146.59	-3,072.54	14,456,300.73	1,700,120.39	39.80638008	-80.78741050
18,810.96	90.55	331.92	6,399.71	11,226.09	-3,114.71	14,456,380.23	1,700,078.22	39.80659869	-80.78756000
18,900.96	90.37	330.60	6,398.98	11,305.00	-3,157.98	14,456,459.14	1,700,034.95	39.80681667	-80.78771341
18,990.96	90.68	330.96	6,398.16	11,383.54	-3,201.92	14,456,537.69	1,699,991.01	39.80703167	-80.78786918

WV Department of Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan N-07HM (Slot A)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan N-07HM (Slot A)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2218dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
19,079.96	90.73	330.60	6,397.06	11,461.21	-3,245.36	14,456,615.36	1,699,947.57	39.80724525	-80.78802322
19,169.96	90.81	329.99	6,395.85	11,539.37	-3,289.95	14,456,693.52	1,699,902.98	39.80746020	-80.78818135
19,259.96	90.99	329.81	6,394.44	11,617.23	-3,335.08	14,456,771.37	1,699,857.85	39.80767430	-80.78834139
19,348.96	90.99	329.72	6,392.90	11,694.11	-3,379.89	14,456,848.26	1,699,813.04	39.80788573	-80.78850030
19,438.96	91.30	329.29	6,391.10	11,771.64	-3,425.56	14,456,925.79	1,699,767.37	39.80809896	-80.78866224
19,528.96	89.89	328.93	6,390.17	11,848.87	-3,471.76	14,457,003.02	1,699,721.17	39.80831134	-80.78882611
19,618.96	90.02	328.93	6,390.24	11,925.96	-3,518.20	14,457,080.11	1,699,674.73	39.80852335	-80.78899085
19,707.96	90.20	329.02	6,390.07	12,002.23	-3,564.08	14,457,156.37	1,699,628.85	39.80873310	-80.78915355
19,797.96	90.77	328.93	6,389.31	12,079.35	-3,610.46	14,457,233.50	1,699,582.47	39.80894519	-80.78931807
19,887.96	90.73	329.20	6,388.13	12,156.54	-3,656.72	14,457,310.69	1,699,536.21	39.80915748	-80.78948216
19,976.96	90.99	329.37	6,386.79	12,233.05	-3,702.18	14,457,387.19	1,699,490.75	39.80936788	-80.78964337
20,066.96	91.03	330.25	6,385.21	12,310.83	-3,747.43	14,457,464.97	1,699,445.50	39.80958177	-80.78980385
20,156.96	90.86	330.25	6,383.72	12,388.95	-3,792.08	14,457,543.10	1,699,400.85	39.80979662	-80.78996220
20,245.96	91.12	329.37	6,382.19	12,465.87	-3,836.83	14,457,620.01	1,699,356.10	39.81000814	-80.79012091
20,335.96	90.77	328.76	6,380.70	12,543.05	-3,883.09	14,457,697.20	1,699,309.84	39.81022041	-80.79028499
20,425.96	91.25	328.58	6,379.12	12,619.92	-3,929.88	14,457,774.07	1,699,263.05	39.81043180	-80.79045096
20,515.96	90.55	329.99	6,377.70	12,697.28	-3,975.84	14,457,851.43	1,699,217.09	39.81064456	-80.79061398
20,604.96	91.21	330.43	6,376.33	12,774.51	-4,020.05	14,457,928.66	1,699,172.88	39.81085693	-80.79077077
20,694.96	91.43	330.43	6,374.26	12,852.77	-4,064.45	14,458,006.91	1,699,128.48	39.81107213	-80.79092823
20,749.96	91.52	330.60	6,372.85	12,900.63	-4,091.51	14,458,054.77	1,699,101.42	39.81120374	-80.79102420
20,750.00	91.52	330.60	6,372.84	12,900.66	-4,091.53	14,458,054.81	1,699,101.40	39.81120384	-80.79102427
Survey @ 20750.00 MD 0.00 TVD									
20,806.00	91.52	330.60	6,371.36	12,949.44	-4,119.01	14,458,103.58	1,699,073.92	39.81133795	-80.79112173
Survey @ 20806.00 MD 6371.36 TVD									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
269.00	269.00	0.82	-0.78	MWD surveys
20,750.00	6,372.84	12,900.66	-4,091.53	Survey @ 20750.00 MD 0.00 TVD
20,806.00	6,371.36	12,949.44	-4,119.01	Survey @ 20806.00 MD 6371.36 TVD

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