



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan S-11HM (slot G)
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 S-11HM (slot G)	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 S-11HM (slot G)					
Well Position	+N/-S	0.00 usft	Northing:	14,445,172.22 usft	Latitude:	39.77579779
	+E/-W	0.00 usft	Easting:	1,703,165.75 usft	Longitude:	-80.77666570
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	1/24/2019	-8.69	66.82	51,990.91618430

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	127.87	

Survey Program	Date	2/9/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
269.00	937.00	MWD surf (Original Hole)	MWD	MWD - Standard	RECEIVED Office of Oil and Gas DEC 29 2020
982.00	14,686.00	MWD (Original Hole)	MWD	MWD - Standard	
14,750.00	14,750.00	Projection (Original Hole)	MWD	MWD - Standard	

Survey	WV Department of Environmental Protection									
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	14,445,172.22	1,703,165.75	39.77579779	-80.77666570	
269.00	1.27	90.33	268.98	-0.02	2.98	14,445,172.20	1,703,168.73	39.77579772	-80.77666509	
MWD surveys										
300.00	0.98	117.98	299.97	-0.14	3.56	14,445,172.08	1,703,169.31	39.77579737	-80.77665304	
331.00	0.71	107.46	330.97	-0.33	3.98	14,445,171.89	1,703,169.73	39.77579687	-80.77665155	
363.00	0.62	129.75	362.97	-0.50	4.30	14,445,171.72	1,703,170.05	39.77579640	-80.77665041	
394.00	0.56	96.70	393.97	-0.62	4.58	14,445,171.60	1,703,170.33	39.77579606	-80.77664941	
426.00	0.41	134.28	425.96	-0.72	4.82	14,445,171.50	1,703,170.56	39.77579578	-80.77664857	
457.00	0.25	124.00	456.96	-0.83	4.95	14,445,171.39	1,703,170.70	39.77579547	-80.77664809	
488.00	0.33	139.08	487.96	-0.94	5.07	14,445,171.28	1,703,170.81	39.77579518	-80.77664768	



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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
520.00	0.22	138.10	519.96	-1.05	5.17	14,445,171.16	1,703,170.92	39.77579486	-80.77664732
551.00	0.16	207.37	550.96	-1.14	5.19	14,445,171.08	1,703,170.94	39.77579463	-80.77664725
582.00	0.13	121.58	581.96	-1.19	5.20	14,445,171.03	1,703,170.95	39.77579448	-80.77664722
614.00	0.42	178.05	613.96	-1.33	5.23	14,445,170.89	1,703,170.98	39.77579410	-80.77664709
646.00	0.33	121.65	645.96	-1.50	5.31	14,445,170.72	1,703,171.06	39.77579365	-80.77664680
677.00	0.25	182.80	676.96	-1.61	5.39	14,445,170.61	1,703,171.14	39.77579333	-80.77664654
708.00	0.36	145.39	707.96	-1.76	5.44	14,445,170.46	1,703,171.19	39.77579293	-80.77664636
739.00	0.34	163.37	738.96	-1.93	5.52	14,445,170.29	1,703,171.27	39.77579246	-80.77664607
771.00	0.16	143.73	770.96	-2.05	5.57	14,445,170.17	1,703,171.32	39.77579211	-80.77664588
802.00	0.25	137.10	801.96	-2.14	5.65	14,445,170.08	1,703,171.39	39.77579188	-80.77664563
847.00	0.30	175.75	846.96	-2.33	5.72	14,445,169.89	1,703,171.47	39.77579136	-80.77664536
892.00	0.29	135.87	891.96	-2.53	5.81	14,445,169.69	1,703,171.56	39.77579081	-80.77664505
937.00	0.27	168.46	936.96	-2.71	5.91	14,445,169.51	1,703,171.66	39.77579030	-80.77664469
982.00	0.59	187.04	981.96	-3.05	5.90	14,445,169.17	1,703,171.65	39.77578939	-80.77664472
1,071.00	0.52	280.44	1,070.95	-3.43	5.45	14,445,168.79	1,703,171.20	39.77578834	-80.77664634
1,161.00	0.77	277.20	1,160.95	-3.28	4.45	14,445,168.94	1,703,170.20	39.77578876	-80.77664990
1,251.00	0.64	266.61	1,250.94	-3.23	3.35	14,445,168.99	1,703,169.09	39.77578889	-80.77665382
1,341.00	0.75	344.92	1,340.94	-2.69	2.69	14,445,169.53	1,703,168.44	39.77579038	-80.77665615
1,430.00	1.83	25.95	1,429.91	-0.85	3.16	14,445,171.37	1,703,168.91	39.77579543	-80.77665446
1,520.00	3.53	39.39	1,519.81	2.58	5.55	14,445,174.80	1,703,171.30	39.77580484	-80.77664593
1,610.00	5.59	37.67	1,609.52	8.19	9.99	14,445,180.41	1,703,175.73	39.77582022	-80.77663009
1,699.00	8.02	29.60	1,697.89	17.02	15.70	14,445,189.24	1,703,181.45	39.77584444	-80.77660966
1,789.00	9.47	26.13	1,786.84	29.13	22.06	14,445,201.35	1,703,187.81	39.77587764	-80.77658691
1,879.00	11.23	25.39	1,875.38	43.70	29.08	14,445,215.92	1,703,194.83	39.77591759	-80.77656180
1,968.00	14.26	27.37	1,962.17	61.26	37.84	14,445,233.48	1,703,203.59	39.77596578	-80.77653048
2,058.00	15.46	29.68	2,049.16	81.53	48.88	14,445,253.75	1,703,214.63	39.77602136	-80.77649102
2,148.00	15.13	32.84	2,135.98	101.82	61.19	14,445,274.04	1,703,226.94	39.77607700	-80.77644703
2,237.00	14.48	37.39	2,222.02	120.42	74.24	14,445,292.64	1,703,239.99	39.77612799	-80.77640039
2,327.00	12.80	37.19	2,309.48	137.30	87.10	14,445,309.52	1,703,252.85	39.77617427	-80.77635447
2,416.00	13.66	34.22	2,396.12	153.85	98.97	14,445,326.07	1,703,264.72	39.77621962	-80.77631208
2,506.00	12.51	36.13	2,483.78	170.51	110.70	14,445,342.73	1,703,276.45	39.77626530	-80.77627020
2,690.00	7.78	30.61	2,664.86	197.34	128.80	14,445,369.56	1,703,294.55	39.77633886	-80.77620554
2,734.00	7.37	29.01	2,708.48	202.37	131.68	14,445,374.59	1,703,297.43	39.77635265	-80.77619522
2,779.00	9.42	24.72	2,752.99	208.24	134.62	14,445,380.46	1,703,300.37	39.77636876	-80.77618471
2,824.00	12.72	22.38	2,797.15	216.17	138.05	14,445,388.39	1,703,303.80	39.77639051	-80.77617244
2,869.00	14.74	23.18	2,840.86	226.01	142.19	14,445,398.23	1,703,307.94	39.77641751	-80.77615761
2,914.00	17.19	24.60	2,884.12	237.32	147.21	14,445,409.54	1,703,312.96	39.77644854	-80.77613964
2,959.00	19.44	28.81	2,926.84	249.93	153.59	14,445,422.15	1,703,319.34	39.77648313	-80.77611683
3,003.00	20.32	35.36	2,968.22	262.58	161.54	14,445,434.80	1,703,327.29	39.77651781	-80.77608841
3,048.00	20.17	43.28	3,010.45	274.60	171.38	14,445,446.82	1,703,337.13	39.77655076	-80.77605328
3,138.00	22.33	49.95	3,094.34	296.91	195.12	14,445,469.13	1,703,360.86	39.77661184	-80.77596861
3,231.00	23.10	48.57	3,180.13	320.35	222.32	14,445,492.57	1,703,388.07	39.77667603	-80.77587159
3,320.00	23.29	51.11	3,261.93	342.95	249.10	14,445,515.17	1,703,414.85	39.77673791	-80.77577605
3,410.00	25.69	50.52	3,343.83	366.53	278.01	14,445,538.74	1,703,443.76	39.77680246	-80.77567294
3,500.00	28.10	52.75	3,424.09	391.76	309.95	14,445,563.98	1,703,475.70	39.77687155	-80.77555906
3,589.00	27.98	53.83	3,502.65	416.77	343.49	14,445,588.99	1,703,509.24	39.77694000	-80.77543947
3,679.00	29.13	53.51	3,581.70	442.26	378.14	14,445,614.48	1,703,543.89	39.77700976	-80.77531589
3,769.00	31.22	54.98	3,659.50	468.67	414.86	14,445,640.89	1,703,580.61	39.77708205	-80.77518497
3,858.00	33.69	55.69	3,734.59	495.83	454.14	14,445,668.05	1,703,619.89	39.77715635	-80.77504490
3,948.00	34.65	55.18	3,809.06	524.51	495.77	14,445,696.73	1,703,661.52	39.77723483	-80.77489650
4,038.00	35.52	55.72	3,882.70	553.84	538.38	14,445,726.06	1,703,704.13	39.77731510	-80.77474459
4,127.00	35.65	57.37	3,955.08	582.39	581.58	14,445,754.61	1,703,747.33	39.77739320	-80.77459055
4,217.00	36.71	59.12	4,027.73	610.34	626.76	14,445,782.56	1,703,792.51	39.77746964	-80.77442950
4,306.00	39.76	58.59	4,097.63	638.83	673.89	14,445,811.05	1,703,839.64	39.77754757	-80.77426150
4,396.00	42.27	58.08	4,165.53	669.84	724.15	14,445,842.06	1,703,889.90	39.77763237	-80.77408232

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4,486.00	42.05	59.93	4,232.25	700.95	775.93	14,445,873.17	1,703,941.68	39.77771744	-80.77389776
4,575.00	40.63	61.08	4,299.07	729.90	827.09	14,445,902.12	1,703,992.84	39.77779659	-80.77371540
4,665.00	39.11	59.50	4,368.14	758.48	877.20	14,445,930.70	1,704,042.95	39.77787473	-80.77353679
4,754.00	38.98	57.43	4,437.27	787.80	924.98	14,445,960.01	1,704,090.73	39.77795491	-80.77336647
4,844.00	39.53	56.89	4,506.96	818.68	972.83	14,445,990.90	1,704,138.58	39.77803940	-80.77319589
4,934.00	41.03	56.61	4,575.62	850.58	1,021.49	14,446,022.80	1,704,187.24	39.77812668	-80.77302241
5,024.00	41.17	57.79	4,643.44	882.63	1,071.22	14,446,054.85	1,704,236.97	39.77821434	-80.77284512
5,113.00	41.62	59.73	4,710.21	913.15	1,121.53	14,446,085.37	1,704,287.28	39.77829779	-80.77266576
5,203.00	41.41	58.58	4,777.60	943.73	1,172.75	14,446,115.95	1,704,338.50	39.77838143	-80.77248320
5,292.00	40.91	58.12	4,844.60	974.46	1,222.61	14,446,146.68	1,704,388.36	39.77846549	-80.77230544
5,382.00	40.77	58.80	4,912.69	1,005.25	1,272.77	14,446,177.47	1,704,438.52	39.77854969	-80.77212663
5,472.00	40.44	57.83	4,981.02	1,036.02	1,322.62	14,446,208.24	1,704,488.36	39.77863383	-80.77194894
5,561.00	41.26	56.06	5,048.35	1,067.77	1,371.40	14,446,239.99	1,704,537.15	39.77872069	-80.77177502
5,651.00	42.40	56.49	5,115.41	1,101.09	1,421.32	14,446,273.31	1,704,587.07	39.77881186	-80.77159703
5,741.00	42.96	57.35	5,181.57	1,134.39	1,472.44	14,446,306.61	1,704,638.19	39.77890294	-80.77141477
5,830.00	40.54	54.92	5,247.97	1,167.38	1,521.66	14,446,339.60	1,704,687.41	39.77899320	-80.77123930
5,920.00	39.90	55.05	5,316.69	1,200.73	1,569.25	14,446,372.95	1,704,735.00	39.77908445	-80.77106959
6,010.00	39.81	55.67	5,385.78	1,233.51	1,616.71	14,446,405.73	1,704,782.45	39.77917415	-80.77090039
6,099.00	39.52	54.69	5,454.29	1,265.95	1,663.34	14,446,438.17	1,704,829.09	39.77926290	-80.77073410
6,189.00	38.25	56.16	5,524.35	1,298.02	1,709.85	14,446,470.24	1,704,875.60	39.77935064	-80.77056827
6,279.00	37.42	57.25	5,595.43	1,328.32	1,755.99	14,446,500.54	1,704,921.74	39.77943354	-80.77040377
6,368.00	38.11	54.99	5,665.79	1,358.71	1,801.23	14,446,530.93	1,704,966.98	39.77951668	-80.77024247
6,458.00	41.05	55.41	5,735.15	1,391.43	1,848.32	14,446,563.65	1,705,014.07	39.77960620	-80.77007457
6,548.00	44.25	60.44	5,801.36	1,423.71	1,899.99	14,446,595.93	1,705,065.74	39.77969450	-80.76989036
6,638.00	45.00	60.34	5,865.41	1,454.95	1,954.95	14,446,627.17	1,705,120.70	39.77977990	-80.76969444
6,660.00	44.92	59.02	5,880.98	1,462.80	1,968.37	14,446,635.02	1,705,134.12	39.77980135	-80.76964661
6,705.00	44.22	57.88	5,913.04	1,479.32	1,995.28	14,446,651.54	1,705,161.03	39.77984653	-80.76955067
6,750.00	43.21	58.14	5,945.56	1,495.80	2,021.66	14,446,668.02	1,705,187.41	39.77989159	-80.76945664
6,795.00	42.33	63.77	5,978.61	1,510.63	2,048.34	14,446,682.85	1,705,214.09	39.77993214	-80.76936152
6,840.00	40.84	68.87	6,012.27	1,522.64	2,075.67	14,446,694.85	1,705,241.42	39.77996492	-80.76926415
6,885.00	40.57	72.03	6,046.39	1,532.46	2,103.32	14,446,704.67	1,705,269.07	39.77999169	-80.76916565
6,929.00	40.88	76.86	6,079.75	1,540.14	2,130.96	14,446,712.36	1,705,296.70	39.78001261	-80.76906720
6,974.00	41.27	81.87	6,113.68	1,545.59	2,160.00	14,446,717.81	1,705,325.74	39.78002737	-80.76896379
7,019.00	41.76	85.48	6,147.38	1,548.87	2,189.63	14,446,721.09	1,705,355.38	39.78003617	-80.76885828
7,064.00	42.95	88.73	6,180.64	1,550.39	2,219.90	14,446,722.61	1,705,385.65	39.78004013	-80.76875052
7,109.00	43.52	91.80	6,213.42	1,550.25	2,250.72	14,446,722.47	1,705,416.47	39.78003951	-80.76864083
7,154.00	43.43	95.14	6,246.08	1,548.37	2,281.61	14,446,720.59	1,705,447.36	39.78003415	-80.76853088
7,199.00	44.75	99.36	6,278.41	1,544.41	2,312.66	14,446,716.63	1,705,478.41	39.78002304	-80.76842042
7,244.00	47.03	103.67	6,309.74	1,537.94	2,344.30	14,446,710.16	1,705,510.04	39.78000505	-80.76830787
7,288.00	49.80	109.12	6,338.95	1,528.63	2,375.83	14,446,700.85	1,705,541.58	39.77997925	-80.76819570
7,333.00	53.10	115.10	6,367.01	1,515.36	2,408.39	14,446,687.57	1,705,574.14	39.77994257	-80.76807994
7,378.00	56.31	119.75	6,393.01	1,498.42	2,440.96	14,446,670.64	1,705,606.71	39.77989583	-80.76796417
7,423.00	58.99	120.90	6,417.09	1,479.23	2,473.77	14,446,651.44	1,705,639.52	39.77984288	-80.76784758
7,468.00	62.59	122.57	6,439.05	1,458.56	2,507.16	14,446,630.78	1,705,672.91	39.77978589	-80.76772891
7,512.00	65.93	125.29	6,458.16	1,436.43	2,540.03	14,446,608.65	1,705,705.78	39.77972489	-80.76761212
7,557.00	70.07	129.42	6,475.02	1,411.11	2,573.16	14,446,583.33	1,705,738.91	39.77965511	-80.76749442
7,602.00	72.79	132.85	6,489.35	1,383.05	2,605.28	14,446,555.27	1,705,771.03	39.77957782	-80.76738038
7,647.00	74.99	135.75	6,501.84	1,352.86	2,636.21	14,446,525.08	1,705,801.96	39.77949468	-80.76727056
7,692.00	79.38	138.83	6,511.82	1,320.62	2,665.95	14,446,492.84	1,705,831.70	39.77940594	-80.76716499
7,737.00	84.92	142.96	6,517.97	1,286.04	2,694.04	14,446,458.26	1,705,859.79	39.77931078	-80.76706532
7,782.00	84.75	146.21	6,522.02	1,249.52	2,720.01	14,446,421.74	1,705,885.76	39.77921030	-80.76697323
7,871.00	86.99	148.67	6,528.43	1,174.72	2,767.78	14,446,346.94	1,705,933.53	39.77900451	-80.76680392
7,961.00	91.38	149.72	6,529.71	1,097.44	2,813.85	14,446,269.66	1,705,979.60	39.77879196	-80.76664065
8,051.00	89.58	148.85	6,528.96	1,020.07	2,859.82	14,446,192.29	1,706,025.56	39.77857916	-80.76647776
8,140.00	90.11	149.11	6,529.20	943.80	2,905.68	14,446,116.02	1,706,071.43	39.77836937	-80.76631522

WV Department of Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan S-11HM (slot G)
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 S-11HM (slot G)	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
8,230.00	91.16	149.20	6,528.20	866.54	2,951.82	14,446,038.76	1,706,117.57	39.77815685	-80.76615171
8,320.00	90.81	148.14	6,526.65	789.67	2,998.61	14,445,961.89	1,706,164.36	39.77794543	-80.76598589
8,410.00	88.79	148.23	6,526.97	713.20	3,046.05	14,445,885.42	1,706,211.80	39.77773507	-80.76581774
8,499.00	89.19	148.32	6,528.53	637.51	3,092.85	14,445,809.73	1,706,258.60	39.77752687	-80.76565190
8,589.00	89.89	150.16	6,529.26	560.18	3,138.87	14,445,732.40	1,706,304.62	39.77731416	-80.76548880
8,678.00	89.67	150.87	6,529.60	482.71	3,182.68	14,445,654.92	1,706,348.43	39.77710108	-80.76533362
8,768.00	90.24	152.27	6,529.67	403.56	3,225.52	14,445,575.78	1,706,391.27	39.77688343	-80.76518186
8,857.00	89.71	150.87	6,529.71	325.30	3,267.89	14,445,497.52	1,706,433.64	39.77666819	-80.76503178
8,947.00	89.89	150.96	6,530.02	246.65	3,311.64	14,445,418.87	1,706,477.39	39.77645187	-80.76487681
9,037.00	90.64	151.39	6,529.61	167.80	3,355.03	14,445,340.02	1,706,520.78	39.77623503	-80.76472311
9,127.00	89.93	150.78	6,529.16	89.02	3,398.55	14,445,261.24	1,706,564.30	39.77601836	-80.76456897
9,216.00	89.41	150.52	6,529.67	11.45	3,442.17	14,445,183.67	1,706,607.92	39.77580501	-80.76441444
9,306.00	90.33	150.43	6,529.88	-66.86	3,486.52	14,445,105.35	1,706,652.27	39.77558962	-80.76425732
9,396.00	90.02	150.25	6,529.60	-145.07	3,531.06	14,445,027.15	1,706,696.81	39.77537452	-80.76409954
9,485.00	91.43	150.87	6,528.47	-222.57	3,574.80	14,444,949.65	1,706,740.55	39.77516137	-80.76394459
9,575.00	91.47	150.16	6,526.20	-300.89	3,619.08	14,444,871.33	1,706,784.83	39.77494597	-80.76378772
9,665.00	89.19	149.99	6,525.68	-378.88	3,663.98	14,444,793.34	1,706,829.73	39.77473145	-80.76362867
9,754.00	89.14	150.08	6,526.98	-455.98	3,708.42	14,444,716.24	1,706,874.17	39.77451940	-80.76347120
9,844.00	88.84	149.99	6,528.56	-533.94	3,753.37	14,444,638.28	1,706,919.12	39.77430498	-80.76331197
9,934.00	89.58	150.34	6,529.80	-612.00	3,798.14	14,444,560.22	1,706,963.89	39.77409027	-80.76315336
10,023.00	90.02	151.31	6,530.11	-689.71	3,841.53	14,444,482.51	1,707,007.27	39.77387655	-80.76299968
10,113.00	90.51	150.87	6,529.70	-768.49	3,885.03	14,444,403.73	1,707,050.78	39.77365987	-80.76284558
10,203.00	91.21	149.99	6,528.35	-846.76	3,929.44	14,444,325.46	1,707,095.19	39.77344461	-80.76268827
10,292.00	90.68	149.99	6,526.88	-923.82	3,973.95	14,444,248.40	1,707,139.70	39.77323266	-80.76253059
10,382.00	89.89	149.72	6,526.43	-1,001.64	4,019.15	14,444,170.58	1,707,184.89	39.77301860	-80.76237047
10,472.00	89.23	149.11	6,527.12	-1,079.12	4,064.94	14,444,093.10	1,707,230.69	39.77280549	-80.76220823
10,561.00	89.98	150.69	6,527.74	-1,156.11	4,109.57	14,444,016.11	1,707,275.32	39.77259372	-80.76205012
10,651.00	90.11	151.22	6,527.67	-1,234.79	4,153.26	14,443,937.43	1,707,319.01	39.77237732	-80.76189536
10,741.00	89.85	150.34	6,527.70	-1,313.34	4,197.20	14,443,858.88	1,707,362.95	39.77216129	-80.76173974
10,830.00	89.93	150.52	6,527.87	-1,390.75	4,241.12	14,443,781.47	1,707,406.87	39.77194839	-80.76158416
10,920.00	89.76	150.08	6,528.11	-1,468.92	4,285.71	14,443,703.30	1,707,451.46	39.77173337	-80.76142621
11,010.00	89.41	149.90	6,528.76	-1,546.86	4,330.72	14,443,625.36	1,707,496.47	39.77151901	-80.76126675
11,099.00	90.59	150.43	6,528.76	-1,624.06	4,375.00	14,443,548.16	1,707,540.75	39.77130667	-80.76110991
11,189.00	90.33	150.34	6,528.04	-1,702.30	4,419.47	14,443,469.92	1,707,585.22	39.77109147	-80.76095237
11,279.00	89.63	150.52	6,528.07	-1,780.58	4,463.89	14,443,391.64	1,707,629.63	39.77087618	-80.76079505
11,368.00	90.15	151.39	6,528.24	-1,858.38	4,507.09	14,443,313.84	1,707,672.84	39.77066218	-80.76064202
11,458.00	89.54	151.22	6,528.49	-1,937.33	4,550.31	14,443,234.89	1,707,716.06	39.77044506	-80.76048898
11,548.00	90.99	151.57	6,528.07	-2,016.34	4,593.39	14,443,155.88	1,707,759.14	39.77022775	-80.76033639
11,637.00	90.37	151.22	6,527.01	-2,094.47	4,636.00	14,443,077.75	1,707,801.75	39.77001287	-80.76018550
11,727.00	90.59	150.96	6,526.26	-2,173.25	4,679.51	14,442,998.97	1,707,845.26	39.76979620	-80.76003142
11,817.00	90.42	150.08	6,525.47	-2,251.60	4,723.80	14,442,920.62	1,707,889.55	39.76958072	-80.75987455
11,906.00	90.42	149.64	6,524.81	-2,328.56	4,768.48	14,442,843.66	1,707,934.23	39.76936902	-80.75971625
11,996.00	90.07	148.67	6,524.43	-2,405.83	4,814.63	14,442,766.39	1,707,980.38	39.76915648	-80.75955278
12,086.00	89.58	149.29	6,524.70	-2,482.96	4,861.01	14,442,689.26	1,708,026.76	39.76894432	-80.75938846
12,175.00	89.45	148.58	6,525.46	-2,559.19	4,906.93	14,442,613.03	1,708,072.68	39.76873463	-80.75922576
12,265.00	89.49	150.60	6,526.29	-2,636.80	4,952.48	14,442,535.42	1,708,118.23	39.76852115	-80.75906439
12,355.00	89.05	150.78	6,527.44	-2,715.27	4,996.54	14,442,456.95	1,708,162.29	39.76830532	-80.75890836
12,444.00	91.08	151.92	6,527.34	-2,793.37	5,039.21	14,442,378.85	1,708,204.96	39.76809052	-80.75875726
12,534.00	91.16	151.31	6,525.58	-2,872.53	5,081.98	14,442,299.68	1,708,247.73	39.76787280	-80.75860579
12,624.00	90.99	151.39	6,523.89	-2,951.50	5,125.13	14,442,220.72	1,708,290.88	39.76765562	-80.75845301
12,713.00	90.86	151.04	6,522.45	-3,029.49	5,167.98	14,442,142.73	1,708,333.73	39.76744111	-80.75830127
12,803.00	90.59	151.13	6,521.31	-3,108.27	5,211.49	14,442,063.95	1,708,377.24	39.76722445	-80.75814718
12,893.00	89.93	151.48	6,520.90	-3,187.21	5,254.70	14,441,985.01	1,708,420.45	39.76700732	-80.75799416
12,982.00	90.07	150.96	6,520.90	-3,265.22	5,297.55	14,441,907.00	1,708,463.30	39.76679278	-80.75784242
13,072.00	90.02	150.60	6,520.83	-3,343.77	5,341.48	14,441,828.45	1,708,507.23	39.76657674	-80.75768683

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WV Department of Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan S-11HM (slot G)
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 S-11HM (slot G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Survey

 WV Department of
 Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,162.00	91.65	150.96	6,519.52	-3,422.30	5,385.41	14,441,749.92	1,708,551.16	39.76636073	-80.75753126
13,251.00	91.38	150.60	6,517.17	-3,499.95	5,428.84	14,441,672.27	1,708,594.59	39.76614717	-80.75737745
13,341.00	90.46	149.90	6,515.72	-3,578.08	5,473.50	14,441,594.14	1,708,639.25	39.76593228	-80.75721930
13,430.00	89.85	149.72	6,515.48	-3,655.00	5,518.25	14,441,517.21	1,708,684.00	39.76572068	-80.75706078
13,520.00	89.45	149.99	6,516.03	-3,732.83	5,563.45	14,441,439.39	1,708,729.20	39.76550661	-80.75690069
13,610.00	89.10	150.43	6,517.17	-3,810.93	5,608.16	14,441,361.29	1,708,773.91	39.76529179	-80.75674234
13,699.00	88.57	150.69	6,518.98	-3,888.42	5,651.89	14,441,283.80	1,708,817.64	39.76507865	-80.75658746
13,789.00	88.79	150.78	6,521.05	-3,966.91	5,695.88	14,441,205.30	1,708,861.63	39.76486276	-80.75643169
13,879.00	88.26	150.34	6,523.37	-4,045.27	5,740.10	14,441,126.95	1,708,905.85	39.76464726	-80.75627509
13,968.00	89.63	150.96	6,525.01	-4,122.83	5,783.71	14,441,049.39	1,708,949.46	39.76443393	-80.75612063
14,058.00	89.49	150.43	6,525.70	-4,201.31	5,827.76	14,440,970.91	1,708,993.51	39.76421807	-80.75596464
14,148.00	91.21	148.67	6,525.15	-4,278.89	5,873.37	14,440,893.33	1,709,039.12	39.76400467	-80.75580310
14,237.00	90.86	148.14	6,523.54	-4,354.68	5,919.99	14,440,817.54	1,709,085.74	39.76379617	-80.75563794
14,327.00	89.67	149.29	6,523.13	-4,431.59	5,966.73	14,440,740.63	1,709,132.47	39.76358460	-80.75547238
14,417.00	89.80	149.81	6,523.54	-4,509.18	6,012.34	14,440,663.04	1,709,178.08	39.76337119	-80.75531083
14,507.00	89.32	149.02	6,524.23	-4,586.65	6,058.13	14,440,585.57	1,709,223.88	39.76315808	-80.75514864
14,597.00	90.07	151.31	6,524.71	-4,664.72	6,102.90	14,440,507.50	1,709,268.65	39.76294335	-80.75499008
14,686.00	89.85	150.34	6,524.78	-4,742.43	6,146.28	14,440,429.79	1,709,312.03	39.76272962	-80.75483645
Survey @ 14686.00 MD 6524.78 TVD									
14,750.00	89.85	150.34	6,524.94	-4,798.04	6,177.95	14,440,374.18	1,709,343.70	39.76257665	-80.75472429
Survey projected to 14750.00 MD 6524.94 TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
269.00	268.98	-0.02	2.98	MWD surveys
14,686.00	6,524.78	-4,742.43	6,146.28	Survey @ 14686.00 MD 6524.78 TVD
14,750.00	6,524.94	-4,798.04	6,177.95	Survey projected to 14750.00 MD 6524.94 TVD