



Survey Report



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_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-12HU (slot F)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,445,094.20 usft	<b>Latitude:</b>	39.77558321
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,703,210.52 usft	<b>Longitude:</b>	-80.77650704
<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</b>
	IGRF2015	9/28/2019	(°) -8.710	(°) 66.766	(nT) 51,912.76933192

<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)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	332.09	

<b>Survey Program</b>	<b>Date</b>	12/13/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
234.00	918.00	MWD surf (Original Hole)	MWD	MWD - Standard	<b>RECEIVED</b> Office of Oil and Gas  <b>AUG 14 2020</b>  WV Department of Environmental Protection
970.00	2,671.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,781.00	19,564.00	MWD (Original Hole)	MWD	MWD - Standard	
19,617.00	19,617.00	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>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
234.00	0.48	15.23	234.00	0.95	0.26	0.72	0.21	0.21	0.00	
<b>MWD surveys</b>										
325.00	0.48	17.42	324.99	1.68	0.47	1.26	0.02	0.00	2.41	
372.00	0.39	356.77	371.99	2.02	0.52	1.55	0.38	-0.19	-43.94	
415.00	0.35	4.77	414.99	2.30	0.52	1.79	0.15	-0.09	18.60	
462.00	0.30	17.51	461.99	2.56	0.57	2.00	0.19	-0.11	27.11	
506.00	0.17	0.90	505.99	2.74	0.61	2.13	0.33	-0.30	-37.75	



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<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Aug1919_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Rate (°/100usft)
553.00	0.17	16.28	552.99	2.87	0.63	2.24	0.10	0.00	32.72
598.00	0.26	351.06	597.99	3.04	0.63	2.39	0.29	0.20	-56.04
645.00	0.26	22.08	644.99	3.24	0.66	2.56	0.30	0.00	66.00
690.00	0.21	346.58	689.99	3.42	0.68	2.70	0.34	-0.11	-78.89
737.00	0.04	1.52	736.99	3.52	0.66	2.80	0.37	-0.36	31.79
781.00	0.13	305.97	780.99	3.56	0.62	2.86	0.26	0.20	-126.25
828.00	0.17	341.21	827.99	3.66	0.55	2.98	0.21	0.09	74.98
876.00	0.13	344.39	875.99	3.78	0.51	3.10	0.09	-0.08	6.63
918.00	0.21	320.12	917.99	3.88	0.45	3.22	0.25	0.19	-57.79
970.00	0.21	346.58	969.99	4.05	0.37	3.41	0.18	0.00	50.88
1,017.00	0.17	168.07	1,016.99	4.07	0.36	3.42	0.81	-0.09	-379.81
1,065.00	0.17	157.61	1,064.99	3.93	0.40	3.28	0.06	0.00	-21.79
1,112.00	0.70	178.53	1,111.99	3.58	0.44	2.96	1.16	1.13	44.51
1,160.00	0.87	185.82	1,159.98	2.92	0.41	2.39	0.41	0.35	15.19
1,254.00	1.97	173.78	1,253.95	0.61	0.51	0.30	1.21	1.17	-12.81
1,349.00	2.90	178.53	1,348.87	-3.42	0.75	-3.37	1.00	0.98	5.00
1,444.00	3.38	171.23	1,443.72	-8.59	1.24	-8.17	0.66	0.51	-7.68
1,539.00	3.60	169.83	1,538.55	-14.29	2.19	-13.66	0.25	0.23	-1.47
1,634.00	3.95	173.25	1,633.34	-20.48	3.10	-19.55	0.44	0.37	3.60
1,728.00	3.38	169.21	1,727.15	-26.41	4.00	-25.22	0.67	-0.61	-4.30
1,823.00	2.54	162.44	1,822.02	-31.17	5.16	-29.96	0.96	-0.88	-7.13
1,918.00	3.16	156.56	1,916.90	-35.58	6.84	-34.64	0.72	0.65	-6.19
2,013.00	3.86	143.02	2,011.73	-40.54	9.80	-40.41	1.14	0.74	-14.25
2,107.00	3.73	136.43	2,105.52	-45.28	13.81	-46.48	0.48	-0.14	-7.01
2,202.00	2.98	148.47	2,200.36	-49.63	17.24	-51.92	1.08	-0.79	12.67
2,297.00	2.90	171.85	2,295.24	-54.11	18.87	-56.65	1.26	-0.08	24.61
2,392.00	3.95	187.14	2,390.07	-59.74	18.80	-61.59	1.46	1.11	16.09
2,486.00	3.99	183.71	2,483.84	-66.21	18.19	-67.02	0.26	0.04	-3.65
2,581.00	2.94	172.02	2,578.67	-71.92	18.31	-72.13	1.33	-1.11	-12.31
2,671.00	2.76	172.82	2,668.56	-76.36	18.90	-76.32	0.20	-0.20	0.89
2,781.00	3.29	169.92	2,778.40	-82.09	19.79	-81.81	0.50	0.48	-2.64
2,876.00	2.15	165.96	2,873.29	-86.51	20.70	-86.13	1.22	-1.20	-4.17
2,971.00	1.80	179.06	2,968.24	-89.73	21.15	-89.19	0.60	-0.37	13.79
3,065.00	2.10	170.62	3,062.18	-92.90	21.46	-92.14	0.44	0.32	-8.98
3,160.00	2.98	154.71	3,157.09	-96.85	22.80	-96.26	1.18	0.93	-16.75
3,255.00	3.16	116.74	3,251.96	-100.26	26.19	-100.86	2.11	0.19	-39.97
3,349.00	3.69	75.26	3,345.81	-100.66	31.43	-103.66	2.63	0.56	-44.13
3,444.00	4.97	54.26	3,440.54	-97.48	37.73	-103.80	2.12	1.35	-22.11
3,539.00	7.03	49.86	3,535.02	-91.33	45.51	-102.01	2.22	2.17	-4.63
3,634.00	8.57	56.28	3,629.14	-83.65	55.84	-100.06	1.86	1.62	6.76
3,729.00	9.67	52.67	3,722.94	-74.88	68.08	-98.04	1.30	1.16	-3.80
3,823.00	10.28	45.29	3,815.52	-64.19	80.32	-94.32	1.51	0.65	-7.85
3,918.00	9.23	40.37	3,909.14	-52.42	91.28	-89.05	1.41	-1.11	-5.18

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4,013.00	9.53	28.50	4,002.88	-39.71	99.96	-81.88	2.06	0.32	-12.49
4,107.00	10.76	17.69	4,095.42	-24.50	106.34	-71.43	2.41	1.31	-11.50
4,205.00	11.16	9.34	4,191.64	-6.43	110.66	-57.48	1.67	0.41	-8.52
4,299.00	11.42	8.32	4,283.82	11.75	113.49	-42.73	0.35	0.28	-1.09
4,394.00	10.50	11.54	4,377.09	29.54	116.58	-28.46	1.16	-0.97	3.39
4,489.00	11.33	10.92	4,470.37	47.19	120.08	-14.51	0.88	0.87	-0.65
4,584.00	11.11	10.39	4,563.55	65.35	123.50	-0.06	0.26	-0.23	-0.56
4,678.00	10.33	11.63	4,655.91	82.52	126.83	13.55	0.87	-0.83	1.32
4,773.00	11.16	11.54	4,749.24	99.87	130.39	27.22	0.87	0.87	-0.09
4,868.00	10.90	8.11	4,842.49	117.77	133.49	41.58	0.74	-0.27	-3.61
4,963.00	10.46	10.49	4,935.84	135.14	136.33	55.61	0.66	-0.46	2.51
5,058.00	10.50	16.90	5,029.26	151.90	140.42	68.51	1.23	0.04	6.75
5,152.00	11.38	15.32	5,121.55	169.04	145.36	81.34	0.99	0.94	-1.68
5,247.00	11.87	9.61	5,214.61	187.71	149.46	95.92	1.32	0.52	-6.01
5,342.00	11.46	2.31	5,307.65	206.78	151.48	111.82	1.61	-0.43	-7.68
5,437.00	9.62	2.40	5,401.04	224.14	152.19	126.83	1.94	-1.94	0.09
5,531.00	9.22	9.34	5,493.78	239.42	153.74	139.61	1.28	-0.43	7.38
5,626.00	9.00	21.20	5,587.59	253.86	157.66	150.53	1.99	-0.23	12.48
5,721.00	10.72	17.60	5,681.18	269.21	163.02	161.59	1.92	1.81	-3.79
5,816.00	12.56	11.98	5,774.23	287.74	167.84	175.71	2.27	1.94	-5.92
5,911.00	11.95	11.98	5,867.06	307.46	172.02	191.18	0.64	-0.64	0.00
6,005.00	10.11	11.54	5,959.32	325.07	175.69	205.02	1.96	-1.96	-0.47
6,100.00	9.84	10.75	6,052.89	341.21	178.88	217.80	0.32	-0.28	-0.83
6,195.00	9.10	9.43	6,146.59	356.60	181.62	230.11	0.81	-0.78	-1.39
6,290.00	9.14	17.42	6,240.40	371.21	185.11	241.38	1.33	0.04	8.41
6,384.00	9.93	13.82	6,333.10	386.20	189.28	252.68	1.05	0.84	-3.83
6,443.00	10.54	12.15	6,391.16	396.42	191.63	260.61	1.15	1.03	-2.83
6,520.00	9.44	12.94	6,466.99	409.46	194.53	270.78	1.44	-1.43	1.03
6,574.00	9.53	12.24	6,520.25	418.14	196.47	277.54	0.27	0.17	-4.99
6,669.00	9.05	7.50	6,614.01	433.24	199.11	289.64	0.95	-0.51	
6,764.00	5.71	11.10	6,708.21	445.29	201.00	299.41	3.55	-3.52	3.79
6,858.00	4.17	17.25	6,801.85	453.14	202.91	305.45	1.73	-1.64	6.54
6,953.00	2.90	11.72	6,896.67	458.79	204.42	309.74	1.38	-1.34	-5.82
7,048.00	1.40	358.09	6,991.60	462.30	204.87	312.63	1.66	-1.58	-14.35
7,143.00	0.61	331.90	7,086.59	463.91	204.60	314.18	0.94	-0.83	-27.57
7,238.00	0.30	271.34	7,181.59	464.36	204.11	314.81	0.56	-0.33	-63.75
7,332.00	0.39	243.30	7,275.58	464.22	203.58	314.94	0.20	0.10	-29.83
7,427.00	0.70	246.21	7,370.58	463.84	202.76	314.98	0.33	0.33	3.06
7,617.00	1.54	233.82	7,560.54	461.87	199.63	314.70	0.46	0.44	-6.52
7,711.00	0.83	233.73	7,654.52	460.72	198.07	314.42	0.76	-0.76	-0.10
7,806.00	0.62	221.16	7,749.51	459.93	197.17	314.14	0.28	-0.22	-13.23
7,901.00	0.75	89.85	7,844.51	459.54	197.46	313.66	1.32	0.14	-138.22
7,996.00	1.53	93.98	7,939.49	459.45	199.34	312.70	0.83	0.82	4.35
8,090.00	1.97	97.23	8,033.45	459.16	202.20	311.11	0.48	0.47	3.46

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8,185.00	0.96	94.24	8,128.41	458.90	204.61	309.75	1.07	-1.06	-3.15
8,280.00	0.52	322.93	8,223.41	459.18	205.15	309.75	1.43	-0.46	-138.22
8,375.00	1.10	308.70	8,318.40	460.10	204.17	311.01	0.64	0.61	-14.98
8,469.00	1.40	296.57	8,412.38	461.18	202.44	312.77	0.42	0.32	-12.90
8,564.00	0.87	8.64	8,507.36	462.41	201.51	314.30	1.48	-0.56	75.86
8,659.00	1.10	45.55	8,602.35	463.76	202.27	315.14	0.70	0.24	38.85
8,754.00	1.45	61.73	8,697.33	464.97	203.98	315.40	0.53	0.37	17.03
8,848.00	0.35	81.15	8,791.31	465.58	205.31	315.32	1.20	-1.17	20.66
8,943.00	0.97	159.81	8,886.31	464.87	205.88	314.43	1.02	0.65	82.80
9,038.00	1.49	201.73	8,981.29	462.96	205.70	312.83	1.06	0.55	44.13
9,132.00	1.27	227.57	9,075.26	461.13	204.48	311.78	0.69	-0.23	27.49
9,227.00	1.18	252.18	9,170.24	460.12	202.77	311.68	0.56	-0.09	25.91
9,322.00	0.53	267.13	9,265.23	459.79	201.40	312.04	0.72	-0.68	15.74
9,417.00	0.66	345.44	9,360.23	460.30	200.82	312.76	0.80	0.14	82.43
9,511.00	1.36	358.80	9,454.21	461.94	200.66	314.28	0.78	0.74	14.14
9,606.00	0.92	28.24	9,549.19	463.74	201.00	315.72	0.76	-0.46	25.91
9,701.00	0.96	58.29	9,644.18	464.83	202.04	316.19	0.51	0.04	31.63
9,796.00	1.09	59.79	9,739.17	465.70	203.50	316.28	0.14	0.14	1.58
9,890.00	0.79	71.39	9,833.15	466.36	204.88	316.21	0.38	-0.32	12.34
9,985.00	0.13	206.74	9,928.15	466.47	205.45	316.04	0.93	-0.69	142.47
10,080.00	0.74	254.47	10,023.15	466.21	204.81	316.11	0.69	0.64	50.24
10,163.00	0.75	234.69	10,106.14	465.76	203.85	316.16	0.31	0.01	-23.83
10,210.00	0.84	234.78	10,153.14	465.38	203.32	316.08	0.19	0.19	0.19
10,257.00	0.79	234.61	10,200.13	464.99	202.78	315.99	0.11	-0.11	-0.36
10,305.00	0.75	233.29	10,248.13	464.61	202.26	315.90	0.09	-0.08	-2.75
10,356.00	1.14	295.60	10,299.12	464.63	201.53	316.26	2.03	0.76	122.18
10,400.00	2.73	313.88	10,343.09	465.55	200.38	317.60	3.83	3.61	41.55
10,447.00	6.02	321.79	10,389.95	468.26	198.05	321.09	7.10	7.00	16.83
10,495.00	8.97	323.03	10,437.54	473.23	194.24	327.26	6.15	6.15	2.58
10,542.00	11.21	324.26	10,483.81	479.87	189.37	335.41	4.79	4.77	2.62
10,589.00	13.01	325.40	10,529.76	487.93	183.69	345.19	3.86	3.83	2.43
10,636.00	16.00	324.78	10,575.26	497.58	176.95	356.87	6.37	6.36	-1.32
10,684.00	17.93	329.44	10,621.17	509.35	169.38	370.82	4.92	4.02	9.71
10,731.00	20.44	328.91	10,665.55	522.61	161.46	386.24	5.35	5.34	-1.13
10,778.00	22.73	322.50	10,709.26	536.84	151.69	403.39	6.99	4.87	-13.64
10,825.00	25.49	322.85	10,752.16	552.11	140.06	422.33	5.88	5.87	0.74
10,872.00	28.48	324.17	10,794.03	569.26	127.39	443.42	6.49	6.36	2.81
10,919.00	32.00	325.05	10,834.63	588.56	113.69	466.88	7.55	7.49	1.87
10,966.00	35.38	326.45	10,873.73	610.11	99.03	492.79	7.38	7.19	2.98
11,013.00	38.07	327.33	10,911.40	633.65	83.69	520.78	5.83	5.72	1.87
11,061.00	41.93	328.47	10,948.17	659.79	67.30	551.54	8.19	8.04	2.38
11,108.00	46.42	329.00	10,981.87	687.78	50.32	584.23	9.59	9.55	1.13
11,156.00	49.63	329.53	11,013.96	718.45	32.08	619.87	6.74	6.69	1.10

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Survey Report



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_v14

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
11,203.00	53.49	330.14	11,043.18	750.28	13.59	656.65	8.28	8.21	1.30	
11,250.00	56.13	330.76	11,070.26	783.69	-5.34	695.04	5.72	5.62	1.32	
11,297.00	59.08	329.27	11,095.44	818.06	-25.18	734.69	6.82	6.28	-3.17	
11,344.00	62.64	328.12	11,118.32	853.12	-46.51	775.66	7.87	7.57	-2.45	
11,391.00	63.91	328.83	11,139.46	888.90	-68.46	817.56	3.02	2.70	1.51	
11,439.00	67.91	329.44	11,159.05	926.51	-90.93	861.31	8.41	8.33	1.27	
11,486.00	71.03	330.94	11,175.53	964.70	-112.81	905.29	7.28	6.64	3.19	
11,534.00	72.70	332.17	11,190.47	1,004.81	-134.53	950.90	4.25	3.48	2.56	
11,581.00	75.65	331.02	11,203.29	1,044.57	-156.04	996.11	6.70	6.28	-2.45	
11,628.00	81.19	329.97	11,212.72	1,084.63	-178.71	1,042.12	11.99	11.79	-2.23	
11,675.00	83.87	330.14	11,218.83	1,125.00	-201.97	1,088.69	5.71	5.70	0.36	
11,723.00	84.88	329.88	11,223.53	1,166.38	-225.85	1,136.43	2.17	2.10	-0.54	
11,770.00	88.48	329.18	11,226.25	1,206.81	-249.64	1,183.29	7.80	7.66	-1.49	
11,817.00	89.10	329.35	11,227.25	1,247.20	-273.65	1,230.22	1.37	1.32	0.36	
11,912.00	92.22	329.35	11,226.15	1,328.91	-322.07	1,325.10	3.28	3.28	0.00	
12,006.00	91.91	329.44	11,222.76	1,409.77	-369.90	1,418.93	0.34	-0.33	0.10	
12,101.00	91.60	329.09	11,219.86	1,491.38	-418.43	1,513.77	0.49	-0.33	-0.37	
12,196.00	91.25	328.65	11,217.49	1,572.68	-467.53	1,608.59	0.59	-0.37	-0.37	
12,290.00	92.13	330.94	11,214.72	1,653.87	-514.79	1,702.47	2.61	0.94	2.44	
12,385.00	92.09	331.20	11,211.22	1,736.96	-560.72	1,797.39	0.28	-0.04	0.27	
12,479.00	91.87	330.94	11,207.97	1,819.18	-606.16	1,891.32	0.36	-0.23	-0.28	
12,573.00	91.52	330.41	11,205.19	1,901.10	-652.18	1,985.25	0.68	-0.37	-0.56	
12,668.00	90.81	330.50	11,203.26	1,983.73	-699.02	2,080.19	0.75	-0.75	0.09	
12,763.00	90.99	331.46	11,201.77	2,066.79	-745.09	2,175.16	1.03	0.19	1.01	
12,857.00	89.67	332.17	11,201.23	2,149.64	-789.49	2,269.15	1.59	-1.40	0.76	
12,952.00	90.07	329.79	11,201.44	2,232.71	-835.57	2,364.13	2.54	0.42	-2.51	
13,046.00	89.76	329.79	11,201.58	2,313.94	-882.87	2,458.05	0.33	-0.33	0.00	
13,140.00	91.08	329.88	11,200.90	2,395.21	-930.10	2,551.97	1.41	1.40	0.10	
13,235.00	91.34	329.70	11,198.89	2,477.29	-977.89	2,646.88	0.33	0.27	-0.19	
13,328.00	91.03	329.09	11,196.97	2,557.32	-1,025.23	2,739.75	0.74	-0.33	-0.66	
13,422.00	90.81	329.09	11,195.46	2,637.95	-1,073.51	2,833.61	0.23	-0.23	0.00	
13,517.00	90.64	328.56	11,194.25	2,719.23	-1,122.68	2,928.45	0.59	-0.18	-0.56	
13,612.00	90.59	328.74	11,193.23	2,800.35	-1,172.11	3,023.27	0.20	-0.05	0.19	
13,706.00	91.30	331.02	11,191.68	2,881.65	-1,219.27	3,117.18	2.54	0.76	2.43	
13,801.00	91.08	331.99	11,189.71	2,965.12	-1,264.58	3,212.16	1.05	-0.23	1.02	
13,895.00	90.64	331.90	11,188.30	3,048.06	-1,308.79	3,306.15	0.48	-0.47	-0.10	
13,990.00	91.03	330.67	11,186.92	3,131.37	-1,354.42	3,401.12	1.36	0.41	-1.29	
14,084.00	90.81	330.67	11,185.41	3,213.31	-1,400.46	3,495.08	0.23	-0.23	0.00	
14,179.00	92.62	331.20	11,182.56	3,296.30	-1,446.59	3,590.02	1.99	1.91	0.56	
14,273.00	92.18	330.67	11,178.63	3,378.39	-1,492.21	3,683.92	0.73	-0.47	-0.56	
14,368.00	92.09	330.94	11,175.09	3,461.27	-1,538.52	3,778.83	0.30	-0.09	0.28	
14,462.00	91.78	330.85	11,171.91	3,543.35	-1,584.22	3,872.75	0.34	-0.33	-0.10	
14,557.00	91.52	330.32	11,169.18	3,626.07	-1,630.86	3,967.68	0.62	-0.27	-0.56	

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<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,652.00	91.25	329.35	11,166.88	3,708.18	-1,678.58	4,062.58	1.06	-0.28	-1.02
14,747.00	90.81	329.00	11,165.17	3,789.75	-1,727.25	4,157.44	0.59	-0.46	-0.37
14,841.00	90.42	328.74	11,164.17	3,870.21	-1,775.84	4,251.28	0.50	-0.41	-0.28
14,936.00	91.38	329.44	11,162.67	3,951.70	-1,824.64	4,346.14	1.25	1.01	0.74
15,031.00	91.38	329.70	11,160.39	4,033.59	-1,872.74	4,441.02	0.27	0.00	0.27
15,125.00	91.47	330.06	11,158.05	4,114.87	-1,919.90	4,534.92	0.39	0.10	0.38
15,220.00	91.52	330.67	11,155.57	4,197.42	-1,966.85	4,629.85	0.64	0.05	0.64
15,313.00	91.56	331.11	11,153.07	4,278.64	-2,012.08	4,722.79	0.47	0.04	0.47
15,408.00	91.60	331.02	11,150.45	4,361.75	-2,058.03	4,817.74	0.10	0.04	-0.09
15,502.00	91.12	330.76	11,148.22	4,443.86	-2,103.74	4,911.69	0.58	-0.51	-0.28
15,596.00	90.99	330.32	11,146.49	4,525.69	-2,149.97	5,005.64	0.49	-0.14	-0.47
15,691.00	91.16	330.58	11,144.71	4,608.32	-2,196.81	5,100.59	0.33	0.18	0.27
15,786.00	91.56	331.37	11,142.45	4,691.36	-2,242.89	5,195.54	0.93	0.42	0.83
15,880.00	91.82	331.64	11,139.68	4,773.94	-2,287.72	5,289.49	0.40	0.28	0.29
15,975.00	91.43	330.32	11,136.99	4,856.97	-2,333.78	5,384.44	1.45	-0.41	-1.39
16,069.00	91.12	329.53	11,134.89	4,938.30	-2,380.88	5,478.34	0.90	-0.33	-0.84
16,164.00	90.64	329.09	11,133.43	5,019.98	-2,429.36	5,573.22	0.69	-0.51	-0.46
16,258.00	91.82	329.44	11,131.42	5,100.76	-2,477.39	5,667.08	1.31	1.26	0.37
16,353.00	91.60	329.35	11,128.58	5,182.49	-2,525.73	5,761.94	0.25	-0.23	0.56
16,447.00	91.43	329.88	11,126.10	5,263.55	-2,573.26	5,855.82	0.59	-0.18	0.56
16,542.00	92.13	329.62	11,123.15	5,345.57	-2,621.10	5,950.69	0.79	0.74	-0.27
16,637.00	92.00	329.27	11,119.72	5,427.33	-2,669.36	6,045.53	0.39	-0.14	-0.37
16,731.00	91.74	328.56	11,116.66	5,507.79	-2,717.87	6,139.33	0.80	-0.28	-0.76
16,826.00	91.65	329.09	11,113.85	5,589.03	-2,767.02	6,234.14	0.57	-0.09	0.56
16,921.00	91.47	328.83	11,111.26	5,670.40	-2,815.99	6,328.96	0.33	-0.19	-0.27
17,015.00	91.69	329.09	11,108.67	5,750.91	-2,864.44	6,422.78	0.36	0.23	0.28
17,109.00	91.78	328.91	11,105.82	5,831.44	-2,912.83	6,516.60	0.21	0.10	-0.19
17,203.00	92.26	329.44	11,102.51	5,912.11	-2,960.97	6,610.42	0.76	0.51	0.56
17,298.00	92.35	329.70	11,098.69	5,993.96	-3,009.04	6,705.25	0.29	0.09	0.27
17,392.00	92.66	329.70	11,094.58	6,075.04	-3,056.42	6,799.08	0.33	0.33	0.00
17,487.00	90.99	329.53	11,091.55	6,156.95	-3,104.45	6,893.94	1.77	-1.76	-0.18
17,582.00	91.12	329.70	11,089.80	6,238.89	-3,152.49	6,988.84	0.23	0.14	0.18
17,676.00	91.08	330.23	11,088.00	6,320.25	-3,199.54	7,082.75	0.57	-0.04	0.56
17,770.00	91.56	329.44	11,085.83	6,401.50	-3,246.76	7,176.66	0.98	0.51	-0.84
17,865.00	91.65	329.70	11,083.17	6,483.38	-3,294.85	7,271.53	0.29	0.09	0.27
17,959.00	91.87	329.79	11,080.29	6,564.54	-3,342.19	7,365.40	0.25	0.23	0.10
18,053.00	91.96	329.88	11,077.15	6,645.76	-3,389.40	7,459.28	0.14	0.10	0.10
18,148.00	91.65	330.23	11,074.15	6,728.04	-3,436.80	7,554.17	0.49	-0.33	0.37
18,242.00	91.38	330.23	11,071.67	6,809.61	-3,483.45	7,648.09	0.29	-0.29	0.00
18,337.00	93.36	329.88	11,067.74	6,891.85	-3,530.83	7,742.94	2.12	2.08	-0.37
18,431.00	93.14	330.06	11,062.41	6,973.10	-3,577.80	7,836.73	0.30	-0.23	0.19
18,525.00	93.23	329.44	11,057.19	7,054.17	-3,625.08	7,930.50	0.67	0.10	-0.66
18,620.00	93.01	329.35	11,052.02	7,135.82	-3,673.38	8,025.26	0.25	-0.23	-0.09
18,714.00	92.09	328.65	11,047.83	7,216.31	-3,721.74	8,119.03	1.23	-0.98	-0.74

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<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_v14

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
18,809.00	90.46	329.35	11,045.72	7,297.72	-3,770.65	8,213.86	1.87	-1.72	0.74	
18,903.00	89.67	330.67	11,045.61	7,379.13	-3,817.64	8,307.80	1.64	-0.84	1.40	
18,997.00	89.23	330.58	11,046.52	7,461.04	-3,863.75	8,401.76	0.48	-0.47	-0.10	
19,092.00	89.23	330.58	11,047.79	7,543.78	-3,910.41	8,496.72	0.00	0.00	0.00	
19,186.00	89.36	330.41	11,048.95	7,625.59	-3,956.70	8,590.68	0.23	0.14	-0.18	
19,281.00	89.10	330.32	11,050.23	7,708.15	-4,003.67	8,685.62	0.29	-0.27	-0.09	
19,375.00	89.10	330.32	11,051.70	7,789.81	-4,050.21	8,779.57	0.00	0.00	0.00	
19,470.00	89.01	330.06	11,053.27	7,872.23	-4,097.43	8,874.50	0.29	-0.09	-0.27	
19,564.00	89.23	330.32	11,054.71	7,953.78	-4,144.15	8,968.44	0.36	0.23	0.28	
<b>Survey @ 19564.00 MD 11054.71 TVD</b>										
19,617.00	89.23	330.32	11,055.43	7,999.82	-4,170.39	9,021.41	0.00	0.00	0.00	
<b>Survey projected to 19617.00 MD 11055.43 TVD</b>										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
234.00	234.00	0.95	0.26	MWD surveys	
19,564.00	11,054.71	7,953.78	-4,144.15	Survey @ 19564.00 MD 11054.71 TVD	
19,617.00	11,055.43	7,999.82	-4,170.39	Survey projected to 19617.00 MD 11055.43 TVD	

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Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_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-12HU (slot F)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,445,094.20 usft	<b>Latitude:</b>	39.77558321
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,703,210.52 usft	<b>Longitude:</b>	-80.77650704
<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</b>
	IGRF2015	9/28/2019	(°)	(°)	(nT)
			-8.710	66.766	51,912.76933192

<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)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	332.09	

<b>Survey Program</b>	<b>Date</b>	12/13/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
234.00	918.00	MWD surf (Original Hole)	MWD	MWD - Standard	
970.00	2,671.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,781.00	19,564.00	MWD (Original Hole)	MWD	MWD - Standard	
19,617.00	19,617.00	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	14,445,094.20	1,703,210.52	39.77558321	-80.77650704	
234.00	0.48	15.23	234.00	0.95	0.26	14,445,095.14	1,703,210.78	39.77558581	-80.77650612	
<b>MWD surveys</b>										
325.00	0.48	17.42	324.99	1.68	0.47	14,445,095.87	1,703,210.99	39.77558781	-80.77650535	
372.00	0.39	356.77	371.99	2.02	0.52	14,445,096.22	1,703,211.04	39.77558877	-80.77650517	
415.00	0.35	4.77	414.99	2.30	0.52	14,445,096.50	1,703,211.05	39.77558953	-80.77650515	
462.00	0.30	17.51	461.99	2.56	0.57	14,445,096.76	1,703,211.10	39.77559024	-80.77650498	
506.00	0.17	0.90	505.99	2.74	0.61	14,445,096.93	1,703,211.13	39.77559072	-80.77650485	
553.00	0.17	16.28	552.99	2.87	0.63	14,445,097.07	1,703,211.15	39.77559110	-80.77650477	





Survey Report - Geographic



**Company:** Tug Hill Operating LLC  
**Project:** Marshall County, West Virginia.  
**Site:** Bryan Pad  
**Well:** Bryan N-12HU (slot F)  
**Wellbore:** Original Hole  
**Design:** Surveys Original Hole

**Local Co-ordinate Reference:** Well Bryan N-12HU (slot F)  
**TVD Reference:** RKB=1191+25 @ 1216.00usft (H&P 611)  
**MD Reference:** RKB=1191+25 @ 1216.00usft (H&P 611)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** DB\_Aug1919\_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
598.00	0.26	351.06	597.99	3.04	0.63	14,445,097.24	1,703,211.15	39.77559155	-80.77650476
645.00	0.26	22.08	644.99	3.24	0.66	14,445,097.44	1,703,211.18	39.77559211	-80.77650468
690.00	0.21	346.58	689.99	3.42	0.68	14,445,097.61	1,703,211.20	39.77559259	-80.77650461
737.00	0.04	1.52	736.99	3.52	0.66	14,445,097.71	1,703,211.18	39.77559287	-80.77650468
781.00	0.13	305.97	780.99	3.56	0.62	14,445,097.76	1,703,211.14	39.77559299	-80.77650482
828.00	0.17	341.21	827.99	3.66	0.55	14,445,097.86	1,703,211.07	39.77559326	-80.77650505
876.00	0.13	344.39	875.99	3.78	0.51	14,445,097.98	1,703,211.03	39.77559359	-80.77650518
918.00	0.21	320.12	917.99	3.88	0.45	14,445,098.08	1,703,210.97	39.77559388	-80.77650540
970.00	0.21	346.58	969.99	4.05	0.37	14,445,098.25	1,703,210.89	39.77559433	-80.77650570
1,017.00	0.17	168.07	1,016.99	4.07	0.36	14,445,098.26	1,703,210.88	39.77559438	-80.77650572
1,065.00	0.17	157.61	1,064.99	3.93	0.40	14,445,098.13	1,703,210.93	39.77559400	-80.77650557
1,112.00	0.70	178.53	1,111.99	3.58	0.44	14,445,097.78	1,703,210.96	39.77559304	-80.77650545
1,160.00	0.87	185.82	1,159.98	2.92	0.41	14,445,097.12	1,703,210.93	39.77559124	-80.77650556
1,254.00	1.97	173.78	1,253.95	0.61	0.51	14,445,094.80	1,703,211.03	39.77558488	-80.77650522
1,349.00	2.90	178.53	1,348.87	-3.42	0.75	14,445,090.78	1,703,211.27	39.77557382	-80.77650441
1,444.00	3.38	171.23	1,443.72	-8.59	1.24	14,445,085.61	1,703,211.76	39.77555962	-80.77650271
1,539.00	3.60	169.83	1,538.55	-14.29	2.19	14,445,079.90	1,703,212.71	39.77554395	-80.77649937
1,634.00	3.95	173.25	1,633.34	-20.48	3.10	14,445,073.72	1,703,213.62	39.77552695	-80.77649618
1,728.00	3.38	169.21	1,727.15	-26.41	4.00	14,445,067.78	1,703,214.52	39.77551064	-80.77649303
1,823.00	2.54	162.44	1,822.02	-31.17	5.16	14,445,063.02	1,703,215.68	39.77549757	-80.77648895
1,918.00	3.16	156.56	1,916.90	-35.58	6.84	14,445,058.61	1,703,217.36	39.77548545	-80.77648302
2,013.00	3.86	143.02	2,011.73	-40.54	9.80	14,445,053.66	1,703,220.33	39.77547181	-80.77647251
2,107.00	3.73	136.43	2,105.52	-45.28	13.81	14,445,048.91	1,703,224.34	39.77545876	-80.77645828
2,202.00	2.98	148.47	2,200.36	-49.63	17.24	14,445,044.57	1,703,227.76	39.77544681	-80.77644614
2,297.00	2.90	171.85	2,295.24	-54.11	18.87	14,445,040.09	1,703,229.39	39.77543448	-80.77644037
2,392.00	3.95	187.14	2,390.07	-59.74	18.80	14,445,034.46	1,703,229.32	39.77541903	-80.77644066
2,486.00	3.99	183.71	2,483.84	-66.21	18.19	14,445,027.99	1,703,228.71	39.77540125	-80.77644290
2,581.00	2.94	172.02	2,578.67	-71.92	18.31	14,445,022.27	1,703,228.83	39.77538557	-80.77644251
2,671.00	2.76	172.82	2,668.56	-76.36	18.90	14,445,017.84	1,703,229.42	39.77537338	-80.77644044
2,781.00	3.29	169.92	2,778.40	-82.09	19.79	14,445,012.10	1,703,230.31	39.77535763	-80.77643735
2,876.00	2.15	165.96	2,873.29	-86.51	20.70	14,445,007.69	1,703,231.22	39.77534550	-80.77643415
2,971.00	1.80	179.06	2,968.24	-89.73	21.15	14,445,004.47	1,703,231.67	39.77533665	-80.77643255
3,065.00	2.10	170.62	3,062.18	-92.90	21.46	14,445,001.29	1,703,231.98	39.77532793	-80.77643150
3,160.00	2.98	154.71	3,157.09	-96.85	22.80	14,444,997.34	1,703,233.32	39.77531707	-80.77642677
3,255.00	3.16	116.74	3,251.96	-100.26	26.19	14,444,993.93	1,703,236.71	39.77530768	-80.77641472
3,349.00	3.69	75.26	3,345.81	-100.66	31.43	14,444,993.54	1,703,241.95	39.77530656	-80.77639607
3,444.00	4.97	54.26	3,440.54	-97.48	37.73	14,444,996.72	1,703,248.25	39.77531525	-80.77637363
3,539.00	7.03	49.86	3,535.02	-91.33	45.51	14,445,002.87	1,703,256.03	39.77533209	-80.77634587
3,634.00	8.57	56.28	3,629.14	-83.65	55.84	14,445,010.55	1,703,266.37	39.77535311	-80.77630903
3,729.00	9.67	52.67	3,722.94	-74.88	68.08	14,445,019.32	1,703,278.60	39.77537710	-80.77626541
3,823.00	10.28	45.29	3,815.52	-64.19	80.32	14,445,030.01	1,703,290.84	39.77540637	-80.77622176
3,918.00	9.23	40.37	3,909.14	-52.42	91.28	14,445,041.77	1,703,301.80	39.77543862	-80.77618265
4,013.00	9.53	28.50	4,002.88	-39.71	99.96	14,445,054.49	1,703,310.49	39.77547348	-80.77615161
4,107.00	10.76	17.69	4,095.42	-24.50	106.34	14,445,069.69	1,703,316.87	39.77551519	-80.77612877
4,205.00	11.16	9.34	4,191.64	-6.43	110.66	14,445,087.77	1,703,321.19	39.77556479	-80.77611323
4,299.00	11.42	8.32	4,283.82	11.75	113.49	14,445,105.95	1,703,324.01	39.77561471	-80.77610302
4,394.00	10.50	11.54	4,377.09	29.54	116.58	14,445,123.74	1,703,327.10	39.77566354	-80.77609186
4,489.00	11.33	10.92	4,470.37	47.19	120.08	14,445,141.38	1,703,330.60	39.77571198	-80.77607925
4,584.00	11.11	10.39	4,563.55	65.35	123.50	14,445,159.55	1,703,334.02	39.77576184	-80.77606692
4,678.00	10.33	11.63	4,655.91	82.52	126.83	14,445,176.71	1,703,337.35	39.77580895	-80.77605490
4,773.00	11.16	11.54	4,749.24	99.87	130.39	14,445,194.06	1,703,340.91	39.77585658	-80.77604209
4,868.00	10.90	8.11	4,842.49	117.77	133.49	14,445,211.96	1,703,344.01	39.77590572	-80.77603088
4,963.00	10.46	10.49	4,935.84	135.14	136.33	14,445,229.33	1,703,346.85	39.77595340	-80.77602062
5,058.00	10.50	16.90	5,029.26	151.90	140.42	14,445,246.10	1,703,350.94	39.77599941	-80.77600593
5,152.00	11.38	15.32	5,121.55	169.04	145.36	14,445,263.24	1,703,355.88	39.77604645	-80.77598820



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_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
5,247.00	11.87	9.61	5,214.61	187.71	149.46	14,445,281.91	1,703,359.99	39.77609770	-80.77597341
5,342.00	11.46	2.31	5,307.65	206.78	151.48	14,445,300.97	1,703,362.00	39.77615004	-80.77596608
5,437.00	9.62	2.40	5,401.04	224.14	152.19	14,445,318.34	1,703,362.71	39.77619772	-80.77596339
5,531.00	9.22	9.34	5,493.78	239.42	153.74	14,445,333.62	1,703,364.26	39.77623967	-80.77595773
5,626.00	9.00	21.20	5,587.59	253.86	157.66	14,445,348.05	1,703,368.18	39.77627929	-80.77594364
5,721.00	10.72	17.60	5,681.18	269.21	163.02	14,445,363.41	1,703,373.54	39.77632142	-80.77592443
5,816.00	12.56	11.98	5,774.23	287.74	167.84	14,445,381.93	1,703,378.36	39.77637227	-80.77590712
5,911.00	11.95	11.98	5,867.06	307.46	172.02	14,445,401.66	1,703,382.54	39.77642641	-80.77589205
6,005.00	10.11	11.54	5,959.32	325.07	175.69	14,445,419.26	1,703,386.22	39.77647473	-80.77587883
6,100.00	9.84	10.75	6,052.89	341.21	178.88	14,445,435.41	1,703,389.40	39.77651905	-80.77586736
6,195.00	9.10	9.43	6,146.59	356.60	181.62	14,445,450.80	1,703,392.14	39.77656129	-80.77585745
6,290.00	9.14	17.42	6,240.40	371.21	185.11	14,445,465.41	1,703,395.63	39.77660139	-80.77584490
6,384.00	9.93	13.82	6,333.10	386.20	189.28	14,445,480.40	1,703,399.80	39.77664254	-80.77582992
6,443.00	10.54	12.15	6,391.16	396.42	191.63	14,445,490.62	1,703,402.15	39.77667057	-80.77582146
6,520.00	9.44	12.94	6,466.99	409.46	194.53	14,445,503.65	1,703,405.05	39.77670636	-80.77581104
6,574.00	9.53	12.24	6,520.25	418.14	196.47	14,445,512.34	1,703,406.99	39.77673020	-80.77580406
6,669.00	9.05	7.50	6,614.01	433.24	199.11	14,445,527.43	1,703,409.63	39.77677163	-80.77579452
6,764.00	5.71	11.10	6,708.21	445.29	201.00	14,445,539.48	1,703,411.52	39.77680471	-80.77578770
6,858.00	4.17	17.25	6,801.85	453.14	202.91	14,445,547.33	1,703,413.43	39.77682626	-80.77578082
6,953.00	2.90	11.72	6,896.67	458.79	204.42	14,445,552.99	1,703,414.95	39.77684177	-80.77577538
7,048.00	1.40	358.09	6,991.60	462.30	204.87	14,445,556.50	1,703,415.39	39.77685142	-80.77577375
7,143.00	0.61	331.90	7,086.59	463.91	204.60	14,445,558.11	1,703,415.12	39.77685583	-80.77577472
7,238.00	0.30	271.34	7,181.59	464.36	204.11	14,445,558.56	1,703,414.63	39.77685708	-80.77577645
7,332.00	0.39	243.30	7,275.58	464.22	203.58	14,445,558.42	1,703,414.10	39.77685670	-80.77577835
7,427.00	0.70	246.21	7,370.58	463.84	202.76	14,445,558.04	1,703,413.28	39.77685566	-80.77578127
7,617.00	1.54	233.82	7,560.54	461.87	199.63	14,445,556.06	1,703,410.16	39.77685026	-80.77579240
7,711.00	0.83	233.73	7,654.52	460.72	198.07	14,445,554.92	1,703,408.59	39.77684712	-80.77579799
7,806.00	0.62	221.16	7,749.51	459.93	197.17	14,445,554.12	1,703,407.70	39.77684494	-80.77580118
7,901.00	0.75	89.85	7,844.51	459.54	197.46	14,445,553.74	1,703,407.98	39.77684388	-80.77580017
7,996.00	1.53	93.98	7,939.49	459.45	199.34	14,445,553.65	1,703,409.87	39.77684363	-80.77579346
8,090.00	1.97	97.23	8,033.45	459.16	202.20	14,445,553.36	1,703,412.72	39.77684282	-80.77578330
8,185.00	0.96	94.24	8,128.41	458.90	204.61	14,445,553.10	1,703,415.13	39.77684207	-80.77577471
8,280.00	0.52	322.93	8,223.41	459.18	205.15	14,445,553.38	1,703,415.67	39.77684285	-80.77577281
8,375.00	1.10	308.70	8,318.40	460.10	204.17	14,445,554.30	1,703,414.70	39.77684537	-80.77577626
8,469.00	1.40	296.57	8,412.38	461.18	202.44	14,445,555.37	1,703,412.96	39.77684834	-80.77578241
8,564.00	0.87	8.64	8,507.36	462.41	201.51	14,445,556.61	1,703,412.04	39.77685173	-80.77578571
8,659.00	1.10	45.55	8,602.35	463.76	202.27	14,445,557.96	1,703,412.79	39.77685544	-80.77578299
8,754.00	1.45	61.73	8,697.33	464.97	203.98	14,445,559.16	1,703,414.50	39.77685874	-80.77577690
8,848.00	0.35	81.15	8,791.31	465.58	205.31	14,445,559.77	1,703,415.84	39.77686040	-80.77577216
8,943.00	0.97	159.81	8,886.31	464.87	205.88	14,445,559.06	1,703,416.40	39.77685845	-80.77577015
9,038.00	1.49	201.73	8,981.29	462.96	205.70	14,445,557.16	1,703,416.22	39.77685323	-80.77577081
9,132.00	1.27	227.57	9,075.26	461.13	204.48	14,445,555.32	1,703,415.00	39.77684819	-80.77577517
9,227.00	1.18	252.18	9,170.24	460.12	202.77	14,445,554.31	1,703,413.29	39.77684543	-80.77578126
9,322.00	0.53	267.13	9,265.23	459.79	201.40	14,445,553.99	1,703,411.92	39.77684455	-80.77578614
9,417.00	0.66	345.44	9,360.23	460.30	200.82	14,445,554.50	1,703,411.34	39.77684595	-80.77578819
9,511.00	1.36	358.80	9,454.21	461.94	200.66	14,445,556.14	1,703,411.18	39.77685045	-80.77578874
9,606.00	0.92	28.24	9,549.19	463.74	201.00	14,445,557.94	1,703,411.52	39.77685539	-80.77578753
9,701.00	0.96	58.29	9,644.18	464.83	202.04	14,445,559.03	1,703,412.56	39.77685838	-80.77578382
9,796.00	1.09	59.79	9,739.17	465.70	203.50	14,445,559.90	1,703,414.02	39.77686077	-80.77577863
9,890.00	0.79	71.39	9,833.15	466.36	204.88	14,445,560.56	1,703,415.40	39.77686256	-80.77577368
9,985.00	0.13	206.74	9,928.15	466.47	205.45	14,445,560.67	1,703,415.98	39.77686287	-80.77577165
10,080.00	0.74	254.47	10,023.15	466.21	204.81	14,445,560.41	1,703,415.34	39.77686216	-80.77577393
10,163.00	0.75	234.69	10,106.14	465.76	203.85	14,445,559.95	1,703,414.38	39.77686091	-80.77577734
10,210.00	0.84	234.78	10,153.14	465.38	203.32	14,445,559.57	1,703,413.84	39.77685988	-80.77577924
10,257.00	0.79	234.61	10,200.13	464.99	202.78	14,445,559.19	1,703,413.30	39.77685882	-80.77578119





Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_v14

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AUG 14 2020

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,305.00	0.75	233.29	10,248.13	464.61	202.26	14,445,558.81	1,703,412.78	39.77685778	-80.77578305
10,356.00	1.14	295.60	10,299.12	464.63	201.53	14,445,558.83	1,703,412.05	39.77685784	-80.77578563
10,400.00	2.73	313.88	10,343.09	465.55	200.38	14,445,559.74	1,703,410.90	39.77686036	-80.77578971
10,447.00	6.02	321.79	10,389.95	468.26	198.05	14,445,562.46	1,703,408.57	39.77686783	-80.77579799
10,495.00	8.97	323.03	10,437.54	473.23	194.24	14,445,567.43	1,703,404.76	39.77688150	-80.77581150
10,542.00	11.21	324.26	10,483.81	479.87	189.37	14,445,574.06	1,703,399.89	39.77689976	-80.77582878
10,589.00	13.01	325.40	10,529.76	487.93	183.69	14,445,582.13	1,703,394.22	39.77692194	-80.77584890
10,636.00	16.00	324.78	10,575.26	497.58	176.95	14,445,591.77	1,703,387.47	39.77694849	-80.77587281
10,684.00	17.93	329.44	10,621.17	509.35	169.38	14,445,603.54	1,703,379.90	39.77698086	-80.77589966
10,731.00	20.44	328.91	10,665.55	522.61	161.46	14,445,616.80	1,703,371.98	39.77701733	-80.77592772
10,778.00	22.73	322.50	10,709.26	536.84	151.69	14,445,631.04	1,703,362.22	39.77705649	-80.77596236
10,825.00	25.49	322.85	10,752.16	552.11	140.06	14,445,646.31	1,703,350.58	39.77709850	-80.77600365
10,872.00	28.48	324.17	10,794.03	569.26	127.39	14,445,663.46	1,703,337.91	39.77714568	-80.77604859
10,919.00	32.00	325.05	10,834.63	588.56	113.69	14,445,682.75	1,703,324.21	39.77719878	-80.77609717
10,966.00	35.38	326.45	10,873.73	610.11	99.03	14,445,704.31	1,703,309.55	39.77725807	-80.77614915
11,013.00	38.07	327.33	10,911.40	633.65	83.69	14,445,727.85	1,703,294.21	39.77732283	-80.77620356
11,061.00	41.93	328.47	10,948.17	659.79	67.30	14,445,753.99	1,703,277.83	39.77739472	-80.77626163
11,108.00	46.42	329.00	10,981.87	687.78	50.32	14,445,781.98	1,703,260.84	39.77747171	-80.77632185
11,156.00	49.63	329.53	11,013.96	718.45	32.08	14,445,812.65	1,703,242.61	39.77755607	-80.77638646
11,203.00	53.49	330.14	11,043.18	750.28	13.59	14,445,844.47	1,703,224.12	39.77764359	-80.77645199
11,250.00	56.13	330.76	11,070.26	783.69	-5.34	14,445,877.89	1,703,205.18	39.77773548	-80.77651910
11,297.00	59.08	329.27	11,095.44	818.06	-25.18	14,445,912.25	1,703,185.34	39.77782999	-80.77658941
11,344.00	62.64	328.12	11,118.32	853.12	-46.51	14,445,947.32	1,703,164.01	39.77792644	-80.77666502
11,391.00	63.91	328.83	11,139.46	888.90	-68.46	14,445,983.10	1,703,142.06	39.77802486	-80.77674282
11,439.00	67.91	329.44	11,159.05	926.51	-90.93	14,446,020.71	1,703,119.59	39.77812829	-80.77682247
11,486.00	71.03	330.94	11,175.53	964.70	-112.81	14,446,058.89	1,703,097.71	39.77823332	-80.77689998
11,534.00	72.70	332.17	11,190.47	1,004.81	-134.53	14,446,099.00	1,703,075.99	39.77834361	-80.77697695
11,581.00	75.65	331.02	11,203.29	1,044.57	-156.04	14,446,138.77	1,703,054.48	39.77845297	-80.77705316
11,628.00	81.19	329.97	11,212.72	1,084.63	-178.71	14,446,178.82	1,703,031.81	39.77856313	-80.77713350
11,675.00	83.87	330.14	11,218.83	1,125.00	-201.97	14,446,219.20	1,703,008.55	39.77867417	-80.77721592
11,723.00	84.88	329.88	11,223.53	1,166.38	-225.85	14,446,260.57	1,702,984.67	39.77878795	-80.77730054
11,770.00	88.48	329.18	11,226.25	1,206.81	-249.64	14,446,301.01	1,702,960.88	39.77889916	-80.77738486
11,817.00	89.10	329.35	11,227.25	1,247.20	-273.65	14,446,341.40	1,702,936.87	39.77901024	-80.77746998
11,912.00	92.22	329.35	11,226.15	1,328.91	-322.07	14,446,423.11	1,702,888.45	39.77923498	-80.77764160
12,006.00	91.91	329.44	11,222.76	1,409.77	-369.90	14,446,503.96	1,702,840.62	39.77945735	-80.77781111
12,101.00	91.60	329.09	11,219.86	1,491.38	-418.43	14,446,585.58	1,702,792.09	39.77968182	-80.77798312
12,196.00	91.25	328.65	11,217.49	1,572.68	-467.53	14,446,666.87	1,702,743.00	39.77990541	-80.77815716
12,290.00	92.13	330.94	11,214.72	1,653.87	-514.79	14,446,748.07	1,702,695.73	39.78012872	-80.77832469
12,385.00	92.09	331.20	11,211.22	1,736.96	-560.72	14,446,831.16	1,702,649.80	39.78035722	-80.77848742
12,479.00	91.87	330.94	11,207.97	1,819.18	-606.16	14,446,913.38	1,702,604.36	39.78058333	-80.77864845
12,573.00	91.52	330.41	11,205.19	1,901.10	-652.18	14,446,995.30	1,702,558.34	39.78080861	-80.77881152
12,668.00	90.81	330.50	11,203.26	1,983.73	-699.02	14,447,077.93	1,702,511.51	39.78103585	-80.77897750
12,763.00	90.99	331.46	11,201.77	2,066.79	-745.09	14,447,160.99	1,702,465.43	39.78126427	-80.77914079
12,857.00	89.67	332.17	11,201.23	2,149.64	-789.49	14,447,243.84	1,702,421.03	39.78149210	-80.77929808
12,952.00	90.07	329.79	11,201.44	2,232.71	-835.57	14,447,326.91	1,702,374.95	39.78172054	-80.77946138
13,046.00	89.76	329.79	11,201.58	2,313.94	-882.87	14,447,408.14	1,702,327.65	39.78194395	-80.77962903
13,140.00	91.08	329.88	11,200.90	2,395.21	-930.10	14,447,489.41	1,702,280.42	39.78216745	-80.77979643
13,235.00	91.34	329.70	11,198.89	2,477.29	-977.89	14,447,571.48	1,702,232.63	39.78239318	-80.77996582
13,328.00	91.03	329.09	11,196.97	2,557.32	-1,025.23	14,447,651.51	1,702,185.29	39.78261328	-80.78013362
13,422.00	90.81	329.09	11,195.46	2,637.95	-1,073.51	14,447,732.15	1,702,137.01	39.78283506	-80.78030477
13,517.00	90.64	328.56	11,194.25	2,719.23	-1,122.68	14,447,813.43	1,702,087.84	39.78305860	-80.78047909
13,612.00	90.59	328.74	11,193.23	2,800.35	-1,172.11	14,447,894.55	1,702,038.42	39.78328172	-80.78065431
13,706.00	91.30	331.02	11,191.68	2,881.65	-1,219.27	14,447,975.84	1,701,991.25	39.78350529	-80.78082147
13,801.00	91.08	331.99	11,189.71	2,965.12	-1,264.58	14,448,059.31	1,701,945.94	39.78373483	-80.78098203
13,895.00	90.64	331.90	11,188.30	3,048.06	-1,308.79	14,448,142.26	1,701,901.74	39.78396292	-80.78113866



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_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
13,990.00	91.03	330.67	11,186.92	3,131.37	-1,354.42	14,448,225.57	1,701,856.10	39.78419201	-80.78130038
14,084.00	90.81	330.67	11,185.41	3,213.31	-1,400.46	14,448,307.51	1,701,810.06	39.78441734	-80.78146355
14,179.00	92.62	331.20	11,182.56	3,296.30	-1,446.59	14,448,390.50	1,701,763.93	39.78464558	-80.78162703
14,273.00	92.18	330.67	11,178.63	3,378.39	-1,492.21	14,448,472.59	1,701,718.31	39.78487133	-80.78178872
14,368.00	92.09	330.94	11,175.09	3,461.27	-1,538.52	14,448,555.47	1,701,672.00	39.78509923	-80.78195284
14,462.00	91.78	330.85	11,171.91	3,543.35	-1,584.22	14,448,637.55	1,701,626.30	39.78532496	-80.78211479
14,557.00	91.52	330.32	11,169.18	3,626.07	-1,630.86	14,448,720.27	1,701,579.67	39.78555244	-80.78228009
14,652.00	91.25	329.35	11,166.88	3,708.18	-1,678.58	14,448,802.38	1,701,531.94	39.78577826	-80.78244925
14,747.00	90.81	329.00	11,165.17	3,789.75	-1,727.25	14,448,883.94	1,701,483.27	39.78600259	-80.78262180
14,841.00	90.42	328.74	11,164.17	3,870.21	-1,775.84	14,448,964.40	1,701,434.68	39.78622387	-80.78279408
14,936.00	91.38	329.44	11,162.67	3,951.70	-1,824.64	14,449,045.90	1,701,385.88	39.78644801	-80.78296707
15,031.00	91.38	329.70	11,160.39	4,033.59	-1,872.74	14,449,127.79	1,701,337.78	39.78667322	-80.78313759
15,125.00	91.47	330.06	11,158.05	4,114.87	-1,919.90	14,449,209.07	1,701,290.63	39.78689676	-80.78330475
15,220.00	91.52	330.67	11,155.57	4,197.42	-1,966.85	14,449,291.62	1,701,243.67	39.78712376	-80.78347120
15,313.00	91.56	331.11	11,153.07	4,278.64	-2,012.08	14,449,372.84	1,701,198.44	39.78734712	-80.78363150
15,408.00	91.60	331.02	11,150.45	4,361.75	-2,058.03	14,449,455.95	1,701,152.50	39.78757567	-80.78379434
15,502.00	91.12	330.76	11,148.22	4,443.86	-2,103.74	14,449,538.05	1,701,106.78	39.78780145	-80.78395637
15,596.00	90.99	330.32	11,146.49	4,525.69	-2,149.97	14,449,619.88	1,701,060.56	39.78802649	-80.78412021
15,691.00	91.16	330.58	11,144.71	4,608.32	-2,196.81	14,449,702.51	1,701,013.71	39.78825372	-80.78428626
15,786.00	91.56	331.37	11,142.45	4,691.36	-2,242.89	14,449,785.56	1,700,967.63	39.78848209	-80.78444958
15,880.00	91.82	331.64	11,139.68	4,773.94	-2,287.72	14,449,868.13	1,700,922.81	39.78870916	-80.78460844
15,975.00	91.43	330.32	11,136.99	4,856.97	-2,333.78	14,449,951.17	1,700,876.74	39.78893751	-80.78477172
16,069.00	91.12	329.53	11,134.89	4,938.30	-2,380.88	14,450,032.49	1,700,829.65	39.78916116	-80.78493867
16,164.00	90.64	329.09	11,133.43	5,019.98	-2,429.36	14,450,114.18	1,700,781.16	39.78938580	-80.78511056
16,258.00	91.82	329.44	11,131.42	5,100.76	-2,477.39	14,450,194.96	1,700,733.14	39.78960795	-80.78528085
16,353.00	91.60	329.35	11,128.58	5,182.49	-2,525.73	14,450,276.68	1,700,684.79	39.78983272	-80.78545225
16,447.00	91.43	329.88	11,126.10	5,263.55	-2,573.26	14,450,357.74	1,700,637.26	39.79005565	-80.78562075
16,542.00	92.13	329.62	11,123.15	5,345.57	-2,621.10	14,450,439.77	1,700,589.43	39.79028123	-80.78579034
16,637.00	92.00	329.27	11,119.72	5,427.33	-2,669.36	14,450,521.52	1,700,541.16	39.79050607	-80.78596146
16,731.00	91.74	328.56	11,116.66	5,507.79	-2,717.87	14,450,601.98	1,700,492.66	39.79072734	-80.78613345
16,826.00	91.65	329.09	11,113.85	5,589.03	-2,767.02	14,450,683.23	1,700,443.50	39.79095079	-80.78630775
16,921.00	91.47	328.83	11,111.26	5,670.40	-2,815.99	14,450,764.59	1,700,394.53	39.79117456	-80.78648138
17,015.00	91.69	329.09	11,108.67	5,750.91	-2,864.44	14,450,845.10	1,700,346.08	39.79139598	-80.78665318
17,109.00	91.78	328.91	11,105.82	5,831.44	-2,912.83	14,450,925.64	1,700,297.69	39.79161747	-80.78682477
17,203.00	92.26	329.44	11,102.51	5,912.11	-2,960.97	14,451,006.31	1,700,249.55	39.79183933	-80.78699545
17,298.00	92.35	329.70	11,098.69	5,993.96	-3,009.04	14,451,088.16	1,700,201.48	39.79206442	-80.78716591
17,392.00	92.66	329.70	11,094.58	6,075.04	-3,056.42	14,451,169.24	1,700,154.10	39.79228740	-80.78733390
17,487.00	90.99	329.53	11,091.55	6,156.95	-3,104.45	14,451,251.15	1,700,106.07	39.79251265	-80.78750418
17,582.00	91.12	329.70	11,089.80	6,238.89	-3,152.49	14,451,333.08	1,700,058.03	39.79273799	-80.78767452
17,676.00	91.08	330.23	11,088.00	6,320.25	-3,199.54	14,451,414.45	1,700,010.99	39.79296174	-80.78784130
17,770.00	91.56	329.44	11,085.83	6,401.50	-3,246.76	14,451,495.69	1,699,963.77	39.79318518	-80.78800872
17,865.00	91.65	329.70	11,083.17	6,483.38	-3,294.85	14,451,577.58	1,699,915.67	39.79341036	-80.78817926
17,959.00	91.87	329.79	11,080.29	6,564.54	-3,342.19	14,451,658.73	1,699,868.33	39.79363355	-80.78834711
18,053.00	91.96	329.88	11,077.15	6,645.76	-3,389.40	14,451,739.96	1,699,821.12	39.79385692	-80.78851449
18,148.00	91.65	330.23	11,074.15	6,728.04	-3,436.80	14,451,822.24	1,699,773.72	39.79408318	-80.78868254
18,242.00	91.38	330.23	11,071.67	6,809.61	-3,483.45	14,451,903.80	1,699,727.07	39.79430749	-80.78884795
18,337.00	93.36	329.88	11,067.74	6,891.85	-3,530.83	14,451,986.05	1,699,679.69	39.79453366	-80.78901593
18,431.00	93.14	330.06	11,062.41	6,973.10	-3,577.80	14,452,067.30	1,699,632.72	39.79475710	-80.78918246
18,525.00	93.23	329.44	11,057.19	7,054.17	-3,625.08	14,452,148.37	1,699,585.44	39.79498006	-80.78935011
18,620.00	93.01	329.35	11,052.02	7,135.82	-3,673.38	14,452,230.02	1,699,537.15	39.79520459	-80.78952136
18,714.00	92.09	328.65	11,047.83	7,216.31	-3,721.74	14,452,310.51	1,699,488.78	39.79542595	-80.78969287
18,809.00	90.46	329.35	11,045.72	7,297.72	-3,770.65	14,452,391.92	1,699,439.87	39.79564984	-80.78986633
18,903.00	89.67	330.67	11,045.61	7,379.13	-3,817.64	14,452,473.33	1,699,392.88	39.79587372	-80.79003292
18,997.00	89.23	330.58	11,046.52	7,461.04	-3,863.75	14,452,555.24	1,699,346.78	39.79609896	-80.79019639
19,092.00	89.23	330.58	11,047.79	7,543.78	-3,910.41	14,452,637.98	1,699,300.12	39.79632649	-80.79036182

WV Department of Environmental Protection



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<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_Aug1919_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
19,186.00	89.36	330.41	11,048.95	7,625.59	-3,956.70	14,452,719.78	1,699,253.82	39.79655145	-80.79052595
19,281.00	89.10	330.32	11,050.23	7,708.15	-4,003.67	14,452,802.35	1,699,206.85	39.79677850	-80.79069248
19,375.00	89.10	330.32	11,051.70	7,789.81	-4,050.21	14,452,884.01	1,699,160.31	39.79700305	-80.79085749
19,470.00	89.01	330.06	11,053.27	7,872.23	-4,097.43	14,452,966.42	1,699,113.09	39.79722969	-80.79102492
19,564.00	89.23	330.32	11,054.71	7,953.78	-4,144.15	14,453,047.98	1,699,066.37	39.79745396	-80.79119060
<b>Survey @ 19564.00 MD 11054.71 TVD</b>									
19,617.00	89.23	330.32	11,055.43	7,999.82	-4,170.39	14,453,094.02	1,699,040.13	39.79758057	-80.79128364
<b>Survey projected to 19617.00 MD 11055.43 TVD</b>									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
234.00	234.00	0.95	0.26	MWD surveys
19,564.00	11,054.71	7,953.78	-4,144.15	Survey @ 19564.00 MD 11054.71 TVD
19,617.00	11,055.43	7,999.82	-4,170.39	Survey projected to 19617.00 MD 11055.43 TVD

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Environmental Protection



Survey Report



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_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-12HU (slot F)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,445,094.20 usft	<b>Latitude:</b>	39.77558321
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,703,210.52 usft	<b>Longitude:</b>	-80.77650704
<b>Position Uncertainty</b>	0.00 usft		<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,191.00 usft

<b>Wellbore</b>	Sidetrack 01				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	IGRF2015	12/7/2019	(°) -8.717	(°) 66.750	(nT) 51,890.66224643

<b>Design</b>	Surveys Sidetrack 01				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	13,612.00
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	332.09	

<b>Survey Program</b>	<b>Date</b>	12/18/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
234.00	918.00	MWD surf (Original Hole)	MWD	MWD - Standard	
970.00	2,671.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,781.00	13,612.00	MWD (Original Hole)	MWD	MWD - Standard	
13,706.00	21,488.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard	
21,550.00	21,550.00	Projection (Sidetrack 01)	MWD	MWD - Standard	

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<b>Survey</b>										
<b>Measured</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Vertical</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Vertical</b>	<b>Dogleg</b>	<b>Build</b>	<b>Turn</b>	
<b>Depth (usft)</b>	<b>(°)</b>	<b>(°)</b>	<b>Depth (usft)</b>	<b>(usft)</b>	<b>(usft)</b>	<b>Section (usft)</b>	<b>Rate (°/100usft)</b>	<b>Rate (°/100usft)</b>	<b>Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
234.00	0.48	15.23	234.00	0.95	0.26	0.72	0.21	0.21	0.00	0.00
325.00	0.48	17.42	324.99	1.68	0.47	1.26	0.02	0.00	2.41	
372.00	0.39	356.77	371.99	2.02	0.52	1.55	0.38	-0.19	-43.94	
415.00	0.35	4.77	414.99	2.30	0.52	1.79	0.15	-0.09	18.60	
462.00	0.30	17.51	461.99	2.56	0.57	2.00	0.19	-0.11	27.11	
506.00	0.17	0.90	505.99	2.74	0.61	2.13	0.33	-0.30	-37.75	



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<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_v14

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Survey	Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	WV Department of Environmental Protection Rate (°/100usft)
	553.00	0.17	16.28	552.99	2.87	0.63	2.24	0.10	0.00	32.72
	598.00	0.26	351.06	597.99	3.04	0.63	2.39	0.29	0.20	-56.04
	645.00	0.26	22.08	644.99	3.24	0.66	2.56	0.30	0.00	66.00
	690.00	0.21	346.58	689.99	3.42	0.68	2.70	0.34	-0.11	-78.89
	737.00	0.04	1.52	736.99	3.52	0.66	2.80	0.37	-0.36	31.79
	781.00	0.13	305.97	780.99	3.56	0.62	2.86	0.26	0.20	-126.25
	828.00	0.17	341.21	827.99	3.66	0.55	2.98	0.21	0.09	74.98
	876.00	0.13	344.39	875.99	3.78	0.51	3.10	0.09	-0.08	6.63
	918.00	0.21	320.12	917.99	3.88	0.45	3.22	0.25	0.19	-57.79
	970.00	0.21	346.58	969.99	4.05	0.37	3.41	0.18	0.00	50.88
	1,017.00	0.17	168.07	1,016.99	4.07	0.36	3.42	0.81	-0.09	-379.81
	1,065.00	0.17	157.61	1,064.99	3.93	0.40	3.28	0.06	0.00	-21.79
	1,112.00	0.70	178.53	1,111.99	3.58	0.44	2.96	1.16	1.13	44.51
	1,160.00	0.87	185.82	1,159.98	2.92	0.41	2.39	0.41	0.35	15.19
	1,254.00	1.97	173.78	1,253.95	0.61	0.51	0.30	1.21	1.17	-12.81
	1,349.00	2.90	178.53	1,348.87	-3.42	0.75	-3.37	1.00	0.98	5.00
	1,444.00	3.38	171.23	1,443.72	-8.59	1.24	-8.17	0.66	0.51	-7.68
	1,539.00	3.60	169.83	1,538.55	-14.29	2.19	-13.66	0.25	0.23	-1.47
	1,634.00	3.95	173.25	1,633.34	-20.48	3.10	-19.55	0.44	0.37	3.60
	1,728.00	3.38	169.21	1,727.15	-26.41	4.00	-25.22	0.67	-0.61	-4.30
	1,823.00	2.54	162.44	1,822.02	-31.17	5.16	-29.96	0.96	-0.88	-7.13
	1,918.00	3.16	156.56	1,916.90	-35.58	6.84	-34.64	0.72	0.65	-6.19
	2,013.00	3.86	143.02	2,011.73	-40.54	9.80	-40.41	1.14	0.74	-14.25
	2,107.00	3.73	136.43	2,105.52	-45.28	13.81	-46.48	0.48	-0.14	-7.01
	2,202.00	2.98	148.47	2,200.36	-49.63	17.24	-51.92	1.08	-0.79	12.67
	2,297.00	2.90	171.85	2,295.24	-54.11	18.87	-56.65	1.26	-0.08	24.61
	2,392.00	3.95	187.14	2,390.07	-59.74	18.80	-61.59	1.46	1.11	16.09
	2,486.00	3.99	183.71	2,483.84	-66.21	18.19	-67.02	0.26	0.04	-3.65
	2,581.00	2.94	172.02	2,578.67	-71.92	18.31	-72.13	1.33	-1.11	-12.31
	2,671.00	2.76	172.82	2,668.56	-76.36	18.90	-76.32	0.20	-0.20	0.89
	2,781.00	3.29	169.92	2,778.40	-82.09	19.79	-81.81	0.50	0.48	-2.64
	2,876.00	2.15	165.96	2,873.29	-86.51	20.70	-86.13	1.22	-1.20	-4.17
	2,971.00	1.80	179.06	2,968.24	-89.73	21.15	-89.19	0.60	-0.37	13.79
	3,065.00	2.10	170.62	3,062.18	-92.90	21.46	-92.14	0.44	0.32	-8.98
	3,160.00	2.98	154.71	3,157.09	-96.85	22.80	-96.26	1.18	0.93	-16.75
	3,255.00	3.16	116.74	3,251.96	-100.26	26.19	-100.86	2.11	0.19	-39.97
	3,349.00	3.69	75.26	3,345.81	-100.66	31.43	-103.66	2.63	0.56	-44.13
	3,444.00	4.97	54.26	3,440.54	-97.48	37.73	-103.80	2.12	1.35	-22.11
	3,539.00	7.03	49.86	3,535.02	-91.33	45.51	-102.01	2.22	2.17	-4.63
	3,634.00	8.57	56.28	3,629.14	-83.65	55.84	-100.06	1.86	1.62	6.76
	3,729.00	9.67	52.67	3,722.94	-74.88	68.08	-98.04	1.30	1.16	-3.80
	3,823.00	10.28	45.29	3,815.52	-64.19	80.32	-94.32	1.51	0.65	-7.85
	3,918.00	9.23	40.37	3,909.14	-52.42	91.28	-89.05	1.41	-1.11	-5.18



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<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_v14

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4,013.00	9.53	28.50	4,002.88	-39.71	99.96	-81.88	2.06	0.32	-12.49
4,107.00	10.76	17.69	4,095.42	-24.50	106.34	-71.43	2.41	1.31	-11.50
4,205.00	11.16	9.34	4,191.64	-6.43	110.66	-57.48	1.67	0.41	-8.52
4,299.00	11.42	8.32	4,283.82	11.75	113.49	-42.73	0.35	0.28	-1.09
4,394.00	10.50	11.54	4,377.09	29.54	116.58	-28.46	1.16	-0.97	3.39
4,489.00	11.33	10.92	4,470.37	47.19	120.08	-14.51	0.88	0.87	-0.65
4,584.00	11.11	10.39	4,563.55	65.35	123.50	-0.06	0.26	-0.23	-0.56
4,678.00	10.33	11.63	4,655.91	82.52	126.83	13.55	0.87	-0.83	1.32
4,773.00	11.16	11.54	4,749.24	99.87	130.39	27.22	0.87	0.87	-0.09
4,868.00	10.90	8.11	4,842.49	117.77	133.49	41.58	0.74	-0.27	-3.61
4,963.00	10.46	10.49	4,935.84	135.14	136.33	55.61	0.66	-0.46	2.51
5,058.00	10.50	16.90	5,029.26	151.90	140.42	68.51	1.23	0.04	6.75
5,152.00	11.38	15.32	5,121.55	169.04	145.36	81.34	0.99	0.94	-1.68
5,247.00	11.87	9.61	5,214.61	187.71	149.46	95.92	1.32	0.52	-6.01
5,342.00	11.46	2.31	5,307.65	206.78	151.48	111.82	1.61	-0.43	-7.68
5,437.00	9.62	2.40	5,401.04	224.14	152.19	126.83	1.94	-1.94	0.09
5,531.00	9.22	9.34	5,493.78	239.42	153.74	139.61	1.28	-0.43	7.38
5,626.00	9.00	21.20	5,587.59	253.86	157.66	150.53	1.99	-0.23	12.48
5,721.00	10.72	17.60	5,681.18	269.21	163.02	161.59	1.92	1.81	-3.79
5,816.00	12.56	11.98	5,774.23	287.74	167.84	175.71	2.27	1.94	-5.92
5,911.00	11.95	11.98	5,867.06	307.46	172.02	191.18	0.64	-0.64	0.00
6,005.00	10.11	11.54	5,959.32	325.07	175.69	205.02	1.96	-1.96	-0.47
6,100.00	9.84	10.75	6,052.89	341.21	178.88	217.80	0.32	-0.28	-0.83
6,195.00	9.10	9.43	6,146.59	356.60	181.62	230.11	0.81	-0.78	-1.39
6,290.00	9.14	17.42	6,240.40	371.21	185.11	241.38	1.33	0.04	8.41
6,384.00	9.93	13.82	6,333.10	386.20	189.28	252.68	1.05	0.84	-3.83
6,443.00	10.54	12.15	6,391.16	396.42	191.63	260.61	1.15	1.03	-2.83
6,520.00	9.44	12.94	6,466.99	409.46	194.53	270.78	1.44	-1.43	1.03
6,574.00	9.53	12.24	6,520.25	418.14	196.47	277.54	0.27	0.17	-1.30
6,669.00	9.05	7.50	6,614.01	433.24	199.11	289.64	0.95	-0.51	-4.99
6,764.00	5.71	11.10	6,708.21	445.29	201.00	299.41	3.55	-3.52	3.79
6,858.00	4.17	17.25	6,801.85	453.14	202.91	305.45	1.73	-1.64	6.54
6,953.00	2.90	11.72	6,896.67	458.79	204.42	309.74	1.38	-1.34	-5.82
7,048.00	1.40	358.09	6,991.60	462.30	204.87	312.63	1.66	-1.58	-14.35
7,143.00	0.61	331.90	7,086.59	463.91	204.60	314.18	0.94	-0.83	-27.57
7,238.00	0.30	271.34	7,181.59	464.36	204.11	314.81	0.56	-0.33	-63.75
7,332.00	0.39	243.30	7,275.58	464.22	203.58	314.94	0.20	0.10	-29.83
7,427.00	0.70	246.21	7,370.58	463.84	202.76	314.98	0.33	0.33	3.06
7,617.00	1.54	233.82	7,560.54	461.87	199.63	314.70	0.46	0.44	-6.52
7,711.00	0.83	233.73	7,654.52	460.72	198.07	314.42	0.76	-0.76	-0.10
7,806.00	0.62	221.16	7,749.51	459.93	197.17	314.14	0.28	-0.22	-13.23
7,901.00	0.75	89.85	7,844.51	459.54	197.46	313.66	1.32	0.14	-138.22
7,996.00	1.53	93.98	7,939.49	459.45	199.34	312.70	0.83	0.82	4.35
8,090.00	1.97	97.23	8,033.45	459.16	202.20	311.11	0.48	0.47	3.46

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8,185.00	0.96	94.24	8,128.41	458.90	204.61	309.75	1.07	-1.06	-3.15
8,280.00	0.52	322.93	8,223.41	459.18	205.15	309.75	1.43	-0.46	-138.22
8,375.00	1.10	308.70	8,318.40	460.10	204.17	311.01	0.64	0.61	-14.98
8,469.00	1.40	296.57	8,412.38	461.18	202.44	312.77	0.42	0.32	-12.90
8,564.00	0.87	8.64	8,507.36	462.41	201.51	314.30	1.48	-0.56	75.86
8,659.00	1.10	45.55	8,602.35	463.76	202.27	315.14	0.70	0.24	38.85
8,754.00	1.45	61.73	8,697.33	464.97	203.98	315.40	0.53	0.37	17.03
8,848.00	0.35	81.15	8,791.31	465.58	205.31	315.32	1.20	-1.17	20.66
8,943.00	0.97	159.81	8,886.31	464.87	205.88	314.43	1.02	0.65	82.80
9,038.00	1.49	201.73	8,981.29	462.96	205.70	312.83	1.06	0.55	44.13
9,132.00	1.27	227.57	9,075.26	461.13	204.48	311.78	0.69	-0.23	27.49
9,227.00	1.18	252.18	9,170.24	460.12	202.77	311.68	0.56	-0.09	25.91
9,322.00	0.53	267.13	9,265.23	459.79	201.40	312.04	0.72	-0.68	15.74
9,417.00	0.66	345.44	9,360.23	460.30	200.82	312.76	0.80	0.14	82.43
9,511.00	1.36	358.80	9,454.21	461.94	200.66	314.28	0.78	0.74	14.21
9,606.00	0.92	28.24	9,549.19	463.74	201.00	315.72	0.76	-0.46	30.99
9,701.00	0.96	58.29	9,644.18	464.83	202.04	316.19	0.51	0.04	31.63
9,796.00	1.09	59.79	9,739.17	465.70	203.50	316.28	0.14	0.14	1.58
9,890.00	0.79	71.39	9,833.15	466.36	204.88	316.21	0.38	-0.32	12.34
9,985.00	0.13	206.74	9,928.15	466.47	205.45	316.04	0.93	-0.69	142.47
10,080.00	0.74	254.47	10,023.15	466.21	204.81	316.11	0.69	0.64	50.24
10,163.00	0.75	234.69	10,106.14	465.76	203.85	316.16	0.31	0.01	-23.83
10,210.00	0.84	234.78	10,153.14	465.38	203.32	316.08	0.19	0.19	0.19
10,257.00	0.79	234.61	10,200.13	464.99	202.78	315.99	0.11	-0.11	-0.36
10,305.00	0.75	233.29	10,248.13	464.61	202.26	315.90	0.09	-0.08	-2.75
10,356.00	1.14	295.60	10,299.12	464.63	201.53	316.26	2.03	0.76	122.18
10,400.00	2.73	313.88	10,343.09	465.55	200.38	317.60	3.83	3.61	41.55
10,447.00	6.02	321.79	10,389.95	468.26	198.05	321.09	7.10	7.00	16.83
10,495.00	8.97	323.03	10,437.54	473.23	194.24	327.26	6.15	6.15	2.58
10,542.00	11.21	324.26	10,483.81	479.87	189.37	335.41	4.79	4.77	2.62
10,589.00	13.01	325.40	10,529.76	487.93	183.69	345.19	3.86	3.83	2.43
10,636.00	16.00	324.78	10,575.26	497.58	176.95	356.87	6.37	6.36	-1.32
10,684.00	17.93	329.44	10,621.17	509.35	169.38	370.82	4.92	4.02	9.71
10,731.00	20.44	328.91	10,665.55	522.61	161.46	386.24	5.35	5.34	-1.13
10,778.00	22.73	322.50	10,709.26	536.84	151.69	403.39	6.99	4.87	-13.64
10,825.00	25.49	322.85	10,752.16	552.11	140.06	422.33	5.88	5.87	0.74
10,872.00	28.48	324.17	10,794.03	569.26	127.39	443.42	6.49	6.36	2.81
10,919.00	32.00	325.05	10,834.63	588.56	113.69	466.88	7.55	7.49	1.87
10,966.00	35.38	326.45	10,873.73	610.11	99.03	492.79	7.38	7.19	2.98
11,013.00	38.07	327.33	10,911.40	633.65	83.69	520.78	5.83	5.72	1.87
11,061.00	41.93	328.47	10,948.17	659.79	67.30	551.54	8.19	8.04	2.38
11,108.00	46.42	329.00	10,981.87	687.78	50.32	584.23	9.59	9.55	1.13
11,156.00	49.63	329.53	11,013.96	718.45	32.08	619.87	6.74	6.69	1.10



Survey Report



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_v14

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Survey	Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
	11,203.00	53.49	330.14	11,043.18	750.28	13.59	656.65	8.28	8.21	1.30
	11,250.00	56.13	330.76	11,070.28	783.69	-5.34	695.04	5.72	5.62	1.32
	11,297.00	59.08	329.27	11,095.44	818.06	-25.18	734.69	6.82	6.28	-3.17
	11,344.00	62.64	328.12	11,118.32	853.12	-46.51	775.66	7.87	7.57	-2.45
	11,391.00	63.91	328.83	11,139.46	888.90	-68.46	817.56	3.02	2.70	1.51
	11,439.00	67.91	329.44	11,159.05	926.51	-90.93	861.31	8.41	8.33	1.27
	11,486.00	71.03	330.94	11,175.53	964.70	-112.81	905.29	7.28	6.64	3.19
	11,534.00	72.70	332.17	11,190.47	1,004.81	-134.53	950.90	4.25	3.48	2.56
	11,581.00	75.65	331.02	11,203.29	1,044.57	-156.04	996.11	6.70	6.28	-2.45
	11,628.00	81.19	329.97	11,212.72	1,084.63	-178.71	1,042.12	11.99	11.79	-2.23
	11,675.00	83.87	330.14	11,218.83	1,125.00	-201.97	1,088.69	5.71	5.70	0.36
	11,723.00	84.88	329.88	11,223.53	1,166.38	-225.85	1,136.43	2.17	2.10	-0.54
	11,770.00	88.48	329.18	11,226.25	1,206.81	-249.64	1,183.29	7.80	7.66	-1.49
	11,817.00	89.10	329.35	11,227.25	1,247.20	-273.65	1,230.22	1.37	1.32	0.36
	11,912.00	92.22	329.35	11,226.15	1,328.91	-322.07	1,325.10	3.28	3.28	0.00
	12,006.00	91.91	329.44	11,222.76	1,409.77	-369.90	1,418.93	0.34	-0.33	0.10
	12,101.00	91.60	329.09	11,219.86	1,491.38	-418.43	1,513.77	0.49	-0.33	-0.37
	12,196.00	91.25	328.65	11,217.49	1,572.68	-467.53	1,608.59	0.59	-0.37	-0.46
	12,290.00	92.13	330.94	11,214.72	1,653.87	-514.79	1,702.47	2.61	0.94	2.44
	12,385.00	92.09	331.20	11,211.22	1,736.96	-560.72	1,797.39	0.28	-0.04	0.27
	12,479.00	91.87	330.94	11,207.97	1,819.18	-606.16	1,891.32	0.36	-0.23	-0.28
	12,573.00	91.52	330.41	11,205.19	1,901.10	-652.18	1,985.25	0.68	-0.37	-0.56
	12,668.00	90.81	330.50	11,203.26	1,983.73	-699.02	2,080.19	0.75	-0.75	0.09
	12,763.00	90.99	331.46	11,201.77	2,066.79	-745.09	2,175.16	1.03	0.19	1.01
	12,857.00	89.67	332.17	11,201.23	2,149.64	-789.49	2,269.15	1.59	-1.40	0.76
	12,952.00	90.07	329.79	11,201.44	2,232.71	-835.57	2,364.13	2.54	0.42	-2.51
	13,046.00	89.76	329.79	11,201.58	2,313.94	-882.87	2,458.05	0.33	-0.33	0.00
	13,140.00	91.08	329.88	11,200.90	2,395.21	-930.10	2,551.97	1.41	1.40	0.10
	13,235.00	91.34	329.70	11,198.89	2,477.29	-977.89	2,646.88	0.33	0.27	-0.19
	13,328.00	91.03	329.09	11,196.97	2,557.32	-1,025.23	2,739.75	0.74	-0.33	-0.66
	13,422.00	90.81	329.09	11,195.46	2,637.95	-1,073.51	2,833.61	0.23	-0.23	0.00
	13,517.00	90.64	328.56	11,194.25	2,719.23	-1,122.68	2,928.45	0.59	-0.18	-0.56
	13,612.00	90.59	328.74	11,193.23	2,800.35	-1,172.11	3,023.27	0.20	-0.05	0.19
Tie into original hole @ 13612 MD										
	13,706.00	88.31	327.33	11,194.14	2,880.09	-1,221.86	3,117.03	2.85	-2.43	-1.50
	13,800.00	90.99	322.67	11,194.71	2,957.06	-1,275.76	3,210.27	5.72	2.85	-4.96
	13,895.00	91.21	323.29	11,192.89	3,032.90	-1,332.95	3,304.05	0.69	0.23	0.65
	13,990.00	90.95	326.36	11,191.10	3,110.53	-1,387.66	3,398.26	3.24	-0.27	3.23
	14,084.00	92.97	328.39	11,187.88	3,189.64	-1,438.30	3,491.88	3.05	2.15	2.16
	14,178.00	92.53	328.39	11,183.37	3,269.60	-1,487.52	3,585.58	0.47	-0.47	0.00
	14,273.00	91.96	329.18	11,179.65	3,350.78	-1,536.71	3,680.34	1.02	-0.60	0.83
	14,367.00	91.12	330.50	11,177.12	3,432.03	-1,583.92	3,774.24	1.66	-0.89	1.40
	14,462.00	90.86	330.23	11,175.48	3,514.59	-1,630.89	3,869.18	0.39	-0.27	-0.28
	14,556.00	92.66	329.62	11,172.60	3,595.89	-1,677.97	3,963.06	2.02	1.91	-0.65



Survey Report



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	WV Environmental Rate (°/100usft)
14,651.00	92.40	329.97	11,168.40	3,677.91	-1,725.72	4,057.89	0.46	-0.27	0.37
14,747.00	92.18	329.70	11,164.57	3,760.85	-1,773.92	4,153.74	0.36	-0.23	-0.28
14,841.00	91.30	331.46	11,161.71	3,842.68	-1,820.07	4,247.66	2.09	-0.94	1.87
14,936.00	91.38	331.81	11,159.49	3,926.25	-1,865.19	4,342.63	0.38	0.08	0.37
15,030.00	90.99	332.25	11,157.55	4,009.26	-1,909.26	4,436.61	0.63	-0.41	0.47
15,125.00	90.55	330.14	11,156.27	4,092.49	-1,955.03	4,531.59	2.27	-0.46	-2.22
15,219.00	90.20	330.06	11,155.65	4,173.98	-2,001.89	4,625.53	0.38	-0.37	-0.09
15,313.00	91.65	329.79	11,154.14	4,255.31	-2,048.99	4,719.45	1.57	1.54	-0.29
15,407.00	91.47	329.88	11,151.58	4,336.55	-2,096.20	4,813.34	0.21	-0.19	0.10
15,502.00	91.34	329.79	11,149.25	4,418.66	-2,143.93	4,908.24	0.17	-0.14	-0.09
15,596.00	91.16	329.88	11,147.20	4,499.91	-2,191.15	5,002.14	0.21	-0.19	0.10
15,691.00	90.81	330.14	11,145.56	4,582.18	-2,238.63	5,097.06	0.46	-0.37	0.27
15,785.00	90.64	330.23	11,144.38	4,663.73	-2,285.36	5,191.00	0.20	-0.18	0.10
15,880.00	90.33	330.14	11,143.57	4,746.15	-2,332.59	5,285.95	0.34	-0.33	-0.09
15,974.00	91.30	330.50	11,142.23	4,827.81	-2,379.13	5,379.89	1.10	1.03	0.38
16,069.00	90.81	329.53	11,140.48	4,910.08	-2,426.60	5,474.81	1.14	-0.52	-1.02
16,163.00	91.65	327.51	11,138.47	4,990.22	-2,475.67	5,568.60	2.33	0.89	-2.15
16,258.00	92.40	325.57	11,135.11	5,069.42	-2,528.02	5,663.09	2.19	0.79	-2.04
16,353.00	93.05	326.80	11,130.59	5,148.26	-2,580.83	5,757.48	1.46	0.68	1.29
16,447.00	93.49	328.74	11,125.23	5,227.64	-2,630.87	5,851.06	2.11	0.47	2.06
16,542.00	92.09	330.94	11,120.61	5,309.68	-2,678.54	5,945.86	2.74	-1.47	2.32
16,636.00	91.78	331.11	11,117.43	5,391.87	-2,724.05	6,039.79	0.38	-0.33	0.18
16,731.00	91.21	330.67	11,114.95	5,474.84	-2,770.25	6,134.74	0.76	-0.60	-0.46
16,826.00	90.73	330.50	11,113.35	5,557.58	-2,816.90	6,229.69	0.54	-0.51	-0.18
16,920.00	92.04	330.14	11,111.07	5,639.22	-2,863.43	6,323.62	1.45	1.39	-0.38
17,014.00	91.65	329.53	11,108.05	5,720.45	-2,910.64	6,417.49	0.77	-0.41	-0.65
17,109.00	91.12	329.88	11,105.75	5,802.45	-2,958.55	6,512.38	0.67	-0.56	0.37
17,203.00	91.52	329.70	11,103.59	5,883.66	-3,005.84	6,606.28	0.47	0.43	-0.19
17,298.00	91.03	329.18	11,101.47	5,965.45	-3,054.13	6,701.16	0.75	-0.52	-0.55
17,392.00	91.08	330.32	11,099.74	6,046.63	-3,101.47	6,795.06	1.21	0.05	1.21
17,487.00	90.81	330.32	11,098.17	6,129.16	-3,148.51	6,890.00	0.28	-0.28	0.00
17,582.00	90.68	330.85	11,096.94	6,211.90	-3,195.16	6,984.96	0.57	-0.14	0.56
17,671.00	90.86	329.44	11,095.74	6,289.08	-3,239.46	7,073.90	1.60	0.20	-1.58
17,765.00	91.30	330.58	11,093.97	6,370.48	-3,286.43	7,167.82	1.30	0.47	1.21
17,860.00	91.91	332.08	11,091.31	6,453.80	-3,331.99	7,262.77	1.70	0.64	1.58
17,955.00	91.52	331.99	11,088.47	6,537.67	-3,376.52	7,357.73	0.42	-0.41	-0.09
18,049.00	90.86	331.11	11,086.51	6,620.30	-3,421.29	7,451.70	1.17	-0.70	-0.94
18,143.00	91.74	331.46	11,084.38	6,702.71	-3,466.44	7,545.67	1.01	0.94	0.37
18,238.00	91.21	331.64	11,081.94	6,786.21	-3,511.68	7,640.63	0.59	-0.56	0.19
18,332.00	92.00	331.55	11,079.30	6,868.86	-3,556.38	7,734.59	0.85	0.84	-0.10
18,426.00	91.65	330.94	11,076.31	6,951.23	-3,601.58	7,828.53	0.75	-0.37	-0.65
18,521.00	91.03	330.85	11,074.09	7,034.21	-3,647.78	7,923.49	0.66	-0.65	-0.09
18,615.00	90.73	330.50	11,072.64	7,116.16	-3,693.81	8,017.45	0.49	-0.32	-0.37





<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
18,709.00	91.52	329.97	11,070.80	7,197.74	-3,740.46	8,111.38	1.01	0.84	-0.56
18,804.00	90.99	330.14	11,068.72	7,280.04	-3,787.87	8,206.29	0.59	-0.56	0.18
18,898.00	91.82	330.50	11,066.41	7,361.68	-3,834.40	8,300.22	0.96	0.88	0.38
18,993.00	91.52	330.58	11,063.64	7,444.36	-3,881.11	8,395.14	0.33	-0.32	0.08
19,087.00	91.16	330.50	11,061.45	7,526.18	-3,927.32	8,489.08	0.39	-0.38	-0.09
19,181.00	91.87	330.06	11,058.96	7,607.79	-3,973.91	8,583.00	0.89	0.76	-0.47
19,276.00	91.34	329.62	11,056.30	7,689.89	-4,021.62	8,677.89	0.72	-0.56	-0.46
19,371.00	91.21	329.00	11,054.19	7,771.57	-4,070.09	8,772.76	0.67	-0.14	-0.65
19,465.00	91.91	329.09	11,051.63	7,852.15	-4,118.43	8,866.59	0.75	0.74	0.10
19,560.00	91.56	330.58	11,048.75	7,934.25	-4,166.14	8,961.47	1.61	-0.37	1.57
19,655.00	90.95	329.97	11,046.67	8,016.72	-4,213.23	9,056.40	0.91	-0.64	-0.64
19,750.00	91.60	331.02	11,044.56	8,099.38	-4,260.01	9,151.34	1.30	0.68	1.11
19,844.00	91.34	331.20	11,042.15	8,181.66	-4,305.41	9,245.29	0.34	-0.28	0.19
19,939.00	90.95	331.90	11,040.25	8,265.17	-4,350.66	9,340.27	0.84	-0.41	0.74
20,033.00	91.47	332.25	11,038.26	8,348.20	-4,394.67	9,434.25	0.67	0.55	0.37
20,128.00	90.99	332.69	11,036.22	8,432.42	-4,438.57	9,529.22	0.69	-0.51	0.46
20,223.00	91.47	332.43	11,034.18	8,516.72	-4,482.33	9,624.20	0.57	0.51	-0.27
20,318.00	91.03	332.69	11,032.11	8,601.01	-4,526.10	9,719.17	0.54	-0.46	0.27
20,414.00	91.38	331.81	11,030.09	8,685.95	-4,570.79	9,815.15	0.99	0.36	-0.92
20,509.00	91.12	332.08	11,028.02	8,769.76	-4,615.46	9,910.12	0.39	-0.27	0.28
20,602.00	91.30	331.81	11,026.06	8,851.82	-4,659.19	10,003.10	0.35	0.19	-0.29
20,697.00	90.95	331.99	11,024.19	8,935.60	-4,703.93	10,098.08	0.41	-0.37	0.19
20,792.00	91.38	331.99	11,022.26	9,019.46	-4,748.53	10,193.06	0.45	0.45	0.00
20,887.00	91.43	330.50	11,019.93	9,102.72	-4,794.22	10,288.02	1.57	0.05	-1.57
20,982.00	91.21	330.32	11,017.74	9,185.30	-4,841.12	10,382.96	0.30	-0.23	-0.19
21,077.00	90.73	330.23	11,016.13	9,267.79	-4,888.21	10,477.89	0.51	-0.51	-0.09
21,172.00	92.04	330.23	11,013.84	9,350.23	-4,935.37	10,572.81	1.38	1.38	0.00
21,267.00	92.09	330.41	11,010.41	9,432.71	-4,982.38	10,667.71	0.20	0.05	0.19
21,362.00	91.74	330.14	11,007.24	9,515.16	-5,029.46	10,762.61	0.47	-0.37	-0.28
21,457.00	91.38	329.79	11,004.65	9,597.38	-5,076.99	10,857.51	0.53	-0.38	-0.37
21,488.00	91.30	329.70	11,003.93	9,624.15	-5,092.60	10,888.47	0.39	-0.26	-0.29
<b>Survey @ 21488.00 MD 11003.93 TVD</b>									
21,550.00	91.30	329.70	11,002.52	9,677.66	-5,123.88	10,950.40	0.00	0.00	0.00
<b>Survey projected to 21550.00 MD 11002.52 TVD</b>									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
13,612.00	11,193.23	2,800.35	-1,172.11	Tie into original hole @ 13612 MD
21,488.00	11,003.93	9,624.15	-5,092.60	Survey @ 21488.00 MD 11003.93 TVD
21,550.00	11,002.52	9,677.66	-5,123.88	Survey projected to 21550.00 MD 11002.52 TVD



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_v14

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<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-12HU (slot F)					
<b>Well Position</b>	+N/-S	0.00 usft	<b>Northing:</b>	14,445,094.20 usft	<b>Latitude:</b>	39.77558321
	+E/-W	0.00 usft	<b>Easting:</b>	1,703,210.52 usft	<b>Longitude:</b>	-80.77650704
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,191.00 usft

<b>Wellbore</b>	Sidetrack 01				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	IGRF2015	12/7/2019	(°) -8.717	(°) 66.750	(nT) 51,890.66224643

<b>Design</b>	Surveys Sidetrack 01				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	13,612.00
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	332.09	

<b>Survey Program</b>	<b>Date</b>	12/18/2019			
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
(usft)	(usft)				
234.00	918.00	MWD surf (Original Hole)	MWD	MWD - Standard	
970.00	2,671.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,781.00	13,612.00	MWD (Original Hole)	MWD	MWD - Standard	
13,706.00	21,488.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard	
21,550.00	21,550.00	Projection (Sidetrack 01)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Vertical</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Map</b>	<b>Map</b>	<b>Latitude</b>	<b>Longitude</b>	
<b>Depth</b>	(°)	(°)	<b>Depth</b>	<b>(usft)</b>	<b>(usft)</b>	<b>Northing</b>	<b>Easting</b>			
(usft)			(usft)	(usft)	(usft)	(usft)	(usft)			
0.00	0.00	0.00	0.00	0.00	0.00	14,445,094.20	1,703,210.52	39.77558321	-80.77650704	
234.00	0.48	15.23	234.00	0.95	0.26	14,445,095.14	1,703,210.78	39.77558581	-80.77650612	
325.00	0.48	17.42	324.99	1.68	0.47	14,445,095.87	1,703,210.99	39.77558781	-80.77650535	
372.00	0.39	356.77	371.99	2.02	0.52	14,445,096.22	1,703,211.04	39.77558877	-80.77650517	
415.00	0.35	4.77	414.99	2.30	0.52	14,445,096.50	1,703,211.05	39.77558953	-80.77650515	
462.00	0.30	17.51	461.99	2.56	0.57	14,445,096.76	1,703,211.10	39.77559024	-80.77650498	
506.00	0.17	0.90	505.99	2.74	0.61	14,445,096.93	1,703,211.13	39.77559072	-80.77650485	
553.00	0.17	16.28	552.99	2.87	0.63	14,445,097.07	1,703,211.15	39.77559110	-80.77650477	



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_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
598.00	0.26	351.06	597.99	3.04	0.63	14,445,097.24	1,703,211.15	39.77559155	-80.77650476
645.00	0.26	22.08	644.99	3.24	0.66	14,445,097.44	1,703,211.18	39.77559211	-80.77650468
690.00	0.21	346.58	689.99	3.42	0.68	14,445,097.61	1,703,211.20	39.77559259	-80.77650461
737.00	0.04	1.52	736.99	3.52	0.66	14,445,097.71	1,703,211.18	39.77559287	-80.77650468
781.00	0.13	305.97	780.99	3.56	0.62	14,445,097.76	1,703,211.14	39.77559299	-80.77650482
828.00	0.17	341.21	827.99	3.66	0.55	14,445,097.86	1,703,211.07	39.77559326	-80.77650505
876.00	0.13	344.39	875.99	3.78	0.51	14,445,097.98	1,703,211.03	39.77559359	-80.77650518
918.00	0.21	320.12	917.99	3.88	0.45	14,445,098.08	1,703,210.97	39.77559388	-80.77650540
970.00	0.21	346.58	969.99	4.05	0.37	14,445,098.25	1,703,210.89	39.77559433	-80.77650570
1,017.00	0.17	168.07	1,016.99	4.07	0.36	14,445,098.26	1,703,210.88	39.77559438	-80.77650572
1,065.00	0.17	157.61	1,064.99	3.93	0.40	14,445,098.13	1,703,210.93	39.77559400	-80.77650557
1,112.00	0.70	178.53	1,111.99	3.58	0.44	14,445,097.78	1,703,210.96	39.77559304	-80.77650545
1,160.00	0.87	185.82	1,159.98	2.92	0.41	14,445,097.12	1,703,210.93	39.77559124	-80.77650556
1,254.00	1.97	173.78	1,253.95	0.61	0.51	14,445,094.80	1,703,211.03	39.77558488	-80.77650522
1,349.00	2.90	178.53	1,348.87	-3.42	0.75	14,445,090.78	1,703,211.27	39.77557382	-80.77650441
1,444.00	3.38	171.23	1,443.72	-8.59	1.24	14,445,085.61	1,703,211.76	39.77555962	-80.77650271
1,539.00	3.60	169.83	1,538.55	-14.29	2.19	14,445,079.90	1,703,212.71	39.77554395	-80.77649937
1,634.00	3.95	173.25	1,633.34	-20.48	3.10	14,445,073.72	1,703,213.62	39.77552695	-80.77649618
1,728.00	3.38	169.21	1,727.15	-26.41	4.00	14,445,067.78	1,703,214.52	39.77551064	-80.77649303
1,823.00	2.54	162.44	1,822.02	-31.17	5.16	14,445,063.02	1,703,215.68	39.77549757	-80.77648895
1,918.00	3.16	156.56	1,916.90	-35.58	6.84	14,445,058.61	1,703,217.36	39.77548545	-80.77648302
2,013.00	3.86	143.02	2,011.73	-40.54	9.80	14,445,053.66	1,703,220.33	39.77547181	-80.77647251
2,107.00	3.73	136.43	2,105.52	-45.28	13.81	14,445,048.91	1,703,224.34	39.77545876	-80.77645828
2,202.00	2.98	148.47	2,200.36	-49.63	17.24	14,445,044.57	1,703,227.76	39.77544681	-80.77644614
2,297.00	2.90	171.85	2,295.24	-54.11	18.87	14,445,040.09	1,703,229.39	39.77543448	-80.77644037
2,392.00	3.95	187.14	2,390.07	-59.74	18.80	14,445,034.46	1,703,229.32	39.77541903	-80.77644066
2,486.00	3.99	183.71	2,483.84	-66.21	18.19	14,445,027.99	1,703,228.71	39.77540125	-80.77644290
2,581.00	2.94	172.02	2,578.67	-71.92	18.31	14,445,022.27	1,703,228.83	39.77538557	-80.77644251
2,671.00	2.76	172.82	2,668.56	-76.36	18.90	14,445,017.84	1,703,229.42	39.77537338	-80.77644044
2,781.00	3.29	169.92	2,778.40	-82.09	19.79	14,445,012.10	1,703,230.31	39.77535763	-80.77643735
2,876.00	2.15	165.96	2,873.29	-86.51	20.70	14,445,007.69	1,703,231.22	39.77534550	-80.77643415
2,971.00	1.80	179.06	2,968.24	-89.73	21.15	14,445,004.47	1,703,231.67	39.77533665	-80.77643255
3,065.00	2.10	170.62	3,062.18	-92.90	21.46	14,445,001.29	1,703,231.98	39.77532793	-80.77643150
3,160.00	2.98	154.71	3,157.09	-96.85	22.80	14,444,997.34	1,703,233.32	39.77531707	-80.77642677
3,255.00	3.16	116.74	3,251.96	-100.26	26.19	14,444,993.93	1,703,236.71	39.77530768	-80.77641472
3,349.00	3.69	75.26	3,345.81	-100.66	31.43	14,444,993.54	1,703,241.95	39.77530656	-80.77639607
3,444.00	4.97	54.26	3,440.54	-97.48	37.73	14,444,996.72	1,703,248.25	39.77531525	-80.77637363
3,539.00	7.03	49.86	3,535.02	-91.33	45.51	14,445,002.87	1,703,256.03	39.77533209	-80.77634587
3,634.00	8.57	56.28	3,629.14	-83.65	55.84	14,445,010.55	1,703,266.37	39.77535311	-80.77630903
3,729.00	9.67	52.67	3,722.94	-74.88	68.08	14,445,019.32	1,703,278.60	39.77537710	-80.77626541
3,823.00	10.28	45.29	3,815.52	-64.19	80.32	14,445,030.01	1,703,290.84	39.77540637	-80.77622176
3,918.00	9.23	40.37	3,909.14	-52.42	91.28	14,445,041.77	1,703,301.80	39.77543862	-80.77618265
4,013.00	9.53	28.50	4,002.88	-39.71	99.96	14,445,054.49	1,703,310.49	39.77547348	-80.77615161
4,107.00	10.76	17.69	4,095.42	-24.50	106.34	14,445,069.69	1,703,316.87	39.77551519	-80.77612877
4,205.00	11.16	9.34	4,191.64	-6.43	110.66	14,445,087.77	1,703,321.19	39.77556479	-80.77611323
4,299.00	11.42	8.32	4,283.82	11.75	113.49	14,445,105.95	1,703,324.01	39.77561471	-80.77610302
4,394.00	10.50	11.54	4,377.09	29.54	116.58	14,445,123.74	1,703,327.10	39.77566354	-80.77609186
4,489.00	11.33	10.92	4,470.37	47.19	120.08	14,445,141.38	1,703,330.60	39.77571198	-80.77607925
4,584.00	11.11	10.39	4,563.55	65.35	123.50	14,445,159.55	1,703,334.02	39.77576184	-80.77606692
4,678.00	10.33	11.63	4,655.91	82.52	126.83	14,445,176.71	1,703,337.35	39.77580895	-80.77605490
4,773.00	11.16	11.54	4,749.24	99.87	130.39	14,445,194.06	1,703,340.91	39.77585658	-80.77604209
4,868.00	10.90	8.11	4,842.49	117.77	133.49	14,445,211.96	1,703,344.01	39.77590572	-80.77603088
4,963.00	10.46	10.49	4,935.84	135.14	136.33	14,445,229.33	1,703,346.85	39.77595340	-80.77602062
5,058.00	10.50	16.90	5,029.26	151.90	140.42	14,445,246.10	1,703,350.94	39.77599941	-80.77600593
5,152.00	11.38	15.32	5,121.55	169.04	145.36	14,445,263.24	1,703,355.88	39.77604645	-80.77598820



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_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
5,247.00	11.87	9.61	5,214.61	187.71	149.46	14,445,281.91	1,703,359.99	39.77609770	-80.77597341
5,342.00	11.46	2.31	5,307.65	206.78	151.48	14,445,300.97	1,703,362.00	39.77615004	-80.77596608
5,437.00	9.62	2.40	5,401.04	224.14	152.19	14,445,318.34	1,703,362.71	39.77619772	-80.77596339
5,531.00	9.22	9.34	5,493.78	239.42	153.74	14,445,333.62	1,703,364.26	39.77623967	-80.77595773
5,626.00	9.00	21.20	5,587.59	253.86	157.66	14,445,348.05	1,703,368.18	39.77627929	-80.77594364
5,721.00	10.72	17.60	5,681.18	269.21	163.02	14,445,363.41	1,703,373.54	39.77632142	-80.77592443
5,816.00	12.56	11.98	5,774.23	287.74	167.84	14,445,381.93	1,703,378.36	39.77637227	-80.77590712
5,911.00	11.95	11.98	5,867.06	307.46	172.02	14,445,401.66	1,703,382.54	39.77642641	-80.77589205
6,005.00	10.11	11.54	5,959.32	325.07	175.69	14,445,419.26	1,703,386.22	39.77647473	-80.77587883
6,100.00	9.84	10.75	6,052.89	341.21	178.88	14,445,435.41	1,703,389.40	39.77651905	-80.77586736
6,195.00	9.10	9.43	6,146.59	356.80	181.62	14,445,450.80	1,703,392.14	39.77656129	-80.77585745
6,290.00	9.14	17.42	6,240.40	371.21	185.11	14,445,465.41	1,703,395.63	39.77660139	-80.77584490
6,384.00	9.93	13.82	6,333.10	386.20	189.28	14,445,480.40	1,703,399.80	39.77664254	-80.77582992
6,443.00	10.54	12.15	6,391.16	396.42	191.63	14,445,490.62	1,703,402.15	39.77667057	-80.77582146
6,520.00	9.44	12.94	6,466.99	409.46	194.53	14,445,503.65	1,703,405.05	39.77670636	-80.77581104
6,574.00	9.53	12.24	6,520.25	418.14	196.47	14,445,512.34	1,703,406.99	39.77673020	-80.77580406
6,669.00	9.05	7.50	6,614.01	433.24	199.11	14,445,527.43	1,703,409.63	39.77677163	-80.77579452
6,764.00	5.71	11.10	6,708.21	445.29	201.00	14,445,539.48	1,703,411.52	39.77680471	-80.77578770
6,858.00	4.17	17.25	6,801.85	453.14	202.91	14,445,547.33	1,703,413.43	39.77682626	-80.77578082
6,953.00	2.90	11.72	6,896.67	458.79	204.42	14,445,552.99	1,703,414.95	39.77684177	-80.77577538
7,048.00	1.40	358.09	6,991.60	462.30	204.87	14,445,556.50	1,703,415.39	39.77685142	-80.77577375
7,143.00	0.61	331.90	7,086.59	463.91	204.60	14,445,558.11	1,703,415.12	39.77685583	-80.77577472
7,238.00	0.30	271.34	7,181.59	464.36	204.11	14,445,558.56	1,703,414.63	39.77685708	-80.77577645
7,332.00	0.39	243.30	7,275.58	464.22	203.58	14,445,558.42	1,703,414.10	39.77685670	-80.77577835
7,427.00	0.70	246.21	7,370.58	463.84	202.76	14,445,558.04	1,703,413.28	39.77685566	-80.77578127
7,617.00	1.54	233.82	7,560.54	461.87	199.63	14,445,556.06	1,703,410.16	39.77685026	-80.77579240
7,711.00	0.83	233.73	7,654.52	460.72	198.07	14,445,554.92	1,703,408.59	39.77684712	-80.77579799
7,806.00	0.62	221.16	7,749.51	459.93	197.17	14,445,554.12	1,703,407.70	39.77684494	-80.77580118
7,901.00	0.75	89.85	7,844.51	459.54	197.46	14,445,553.74	1,703,407.98	39.77684388	-80.77580017
7,996.00	1.53	93.98	7,939.49	459.45	199.34	14,445,553.65	1,703,409.87	39.77684363	-80.77579346
8,090.00	1.97	97.23	8,033.45	459.16	202.20	14,445,553.36	1,703,412.72	39.77684282	-80.77578330
8,185.00	0.96	94.24	8,128.41	458.90	204.61	14,445,553.10	1,703,415.13	39.77684207	-80.77577471
8,280.00	0.52	322.93	8,223.41	459.18	205.15	14,445,553.38	1,703,415.67	39.77684285	-80.77577281
8,375.00	1.10	308.70	8,318.40	460.10	204.17	14,445,554.30	1,703,414.70	39.77684537	-80.77577626
8,469.00	1.40	296.57	8,412.38	461.18	202.44	14,445,555.37	1,703,412.96	39.77684834	-80.77578241
8,564.00	0.87	8.64	8,507.36	462.41	201.51	14,445,556.61	1,703,412.04	39.77685173	-80.77578571
8,659.00	1.10	45.55	8,602.35	463.76	202.27	14,445,557.96	1,703,412.79	39.77685544	-80.77578299
8,754.00	1.45	61.73	8,697.33	464.97	203.98	14,445,559.16	1,703,414.50	39.77685874	-80.77577690
8,848.00	0.35	81.15	8,791.31	465.58	205.31	14,445,559.77	1,703,415.84	39.77686040	-80.77577216
8,943.00	0.97	159.81	8,886.31	464.87	205.88	14,445,559.06	1,703,416.40	39.77685845	-80.77577015
9,038.00	1.49	201.73	8,981.29	462.96	205.70	14,445,557.16	1,703,416.22	39.77685323	-80.77577081
9,132.00	1.27	227.57	9,075.26	461.13	204.48	14,445,555.32	1,703,415.00	39.77684819	-80.77577517
9,227.00	1.18	252.18	9,170.24	460.12	202.77	14,445,554.31	1,703,413.29	39.77684543	-80.77578126
9,322.00	0.53	267.13	9,265.23	459.79	201.40	14,445,553.99	1,703,411.92	39.77684455	-80.77578614
9,417.00	0.66	345.44	9,360.23	460.30	200.82	14,445,554.50	1,703,411.34	39.77684595	-80.77578819
9,511.00	1.36	358.80	9,454.21	461.94	200.66	14,445,556.14	1,703,411.18	39.77685045	-80.77578874
9,606.00	0.92	28.24	9,549.19	463.74	201.00	14,445,557.94	1,703,411.52	39.77685539	-80.77578753
9,701.00	0.96	58.29	9,644.18	464.83	202.04	14,445,559.03	1,703,412.56	39.77685838	-80.77578382
9,796.00	1.09	59.79	9,739.17	465.70	203.50	14,445,559.90	1,703,414.02	39.77686077	-80.77577863
9,890.00	0.79	71.39	9,833.15	466.36	204.88	14,445,560.56	1,703,415.40	39.77686256	-80.77577368
9,985.00	0.13	206.74	9,928.15	466.47	205.45	14,445,560.67	1,703,415.98	39.77686287	-80.77577165
10,080.00	0.74	254.47	10,023.15	466.21	204.81	14,445,560.41	1,703,415.34	39.77686216	-80.77577393
10,163.00	0.75	234.69	10,106.14	465.76	203.85	14,445,559.95	1,703,414.38	39.77686091	-80.77577734
10,210.00	0.84	234.78	10,153.14	465.38	203.32	14,445,559.57	1,703,413.84	39.77685988	-80.77577924
10,257.00	0.79	234.61	10,200.13	464.99	202.78	14,445,559.19	1,703,413.30	39.77685882	-80.77578119





Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_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
10,305.00	0.75	233.29	10,248.13	464.61	202.26	14,445,558.81	1,703,412.78	39.77685778	-80.77578305
10,356.00	1.14	295.60	10,299.12	464.63	201.53	14,445,558.83	1,703,412.05	39.77685784	-80.77578563
10,400.00	2.73	313.88	10,343.09	465.55	200.38	14,445,559.74	1,703,410.90	39.77686036	-80.77578971
10,447.00	6.02	321.79	10,389.95	468.26	198.05	14,445,562.46	1,703,408.57	39.77686783	-80.77579799
10,495.00	8.97	323.03	10,437.54	473.23	194.24	14,445,567.43	1,703,404.76	39.77688150	-80.77581150
10,542.00	11.21	324.26	10,483.81	479.87	189.37	14,445,574.06	1,703,399.89	39.77689976	-80.77582878
10,589.00	13.01	325.40	10,529.76	487.93	183.69	14,445,582.13	1,703,394.22	39.77692194	-80.77584890
10,636.00	16.00	324.78	10,575.26	497.58	176.95	14,445,591.77	1,703,387.47	39.77694849	-80.77587281
10,684.00	17.93	329.44	10,621.17	509.35	169.38	14,445,603.54	1,703,379.90	39.77698086	-80.77589966
10,731.00	20.44	328.91	10,665.55	522.61	161.46	14,445,616.80	1,703,371.98	39.77701733	-80.77592772
10,778.00	22.73	322.50	10,709.26	536.84	151.69	14,445,631.04	1,703,362.22	39.77705649	-80.77596236
10,825.00	25.49	322.85	10,752.16	552.11	140.06	14,445,646.31	1,703,350.58	39.77709850	-80.77600365
10,872.00	28.48	324.17	10,794.03	569.26	127.39	14,445,663.46	1,703,337.91	39.77714568	-80.77604859
10,919.00	32.00	325.05	10,834.63	588.56	113.69	14,445,682.75	1,703,324.21	39.77719878	-80.77609717
10,966.00	35.38	326.45	10,873.73	610.11	99.03	14,445,704.31	1,703,309.55	39.77725807	-80.77614915
11,013.00	38.07	327.33	10,911.40	633.65	83.69	14,445,727.85	1,703,294.21	39.77732283	-80.77620356
11,061.00	41.93	328.47	10,948.17	659.79	67.30	14,445,753.99	1,703,277.83	39.77739472	-80.77626163
11,108.00	46.42	329.00	10,981.87	687.78	50.32	14,445,781.98	1,703,260.84	39.77747171	-80.77632185
11,156.00	49.63	329.53	11,013.96	718.45	32.08	14,445,812.65	1,703,242.61	39.77755607	-80.77638646
11,203.00	53.49	330.14	11,043.18	750.28	13.59	14,445,844.47	1,703,224.12	39.77764359	-80.77645199
11,250.00	56.13	330.76	11,070.26	783.69	-5.34	14,445,877.89	1,703,205.18	39.77773548	-80.77651910
11,297.00	59.08	329.27	11,095.44	818.06	-25.18	14,445,912.25	1,703,185.34	39.77782999	-80.77658941
11,344.00	62.64	328.12	11,118.32	853.12	-46.51	14,445,947.32	1,703,164.01	39.77792644	-80.77666502
11,391.00	63.91	328.83	11,139.46	888.90	-68.46	14,445,983.10	1,703,142.06	39.77802486	-80.77674282
11,439.00	67.91	329.44	11,159.05	926.51	-90.93	14,446,020.71	1,703,119.59	39.77812829	-80.77682247
11,486.00	71.03	330.94	11,175.53	964.70	-112.81	14,446,058.89	1,703,097.71	39.77823332	-80.77689998
11,534.00	72.70	332.17	11,190.47	1,004.81	-134.53	14,446,099.00	1,703,075.99	39.77834361	-80.77697695
11,581.00	75.65	331.02	11,203.29	1,044.57	-156.04	14,446,138.77	1,703,054.48	39.77845297	-80.77705316
11,628.00	81.19	329.97	11,212.72	1,084.63	-178.71	14,446,178.82	1,703,031.81	39.77856313	-80.77713350
11,675.00	83.87	330.14	11,218.83	1,125.00	-201.97	14,446,219.20	1,703,008.55	39.77867417	-80.77721592
11,723.00	84.88	329.88	11,223.53	1,166.38	-225.85	14,446,260.57	1,702,984.67	39.77878795	-80.77730054
11,770.00	88.48	329.18	11,226.25	1,206.81	-249.64	14,446,301.01	1,702,960.88	39.77889916	-80.77738486
11,817.00	89.10	329.35	11,227.25	1,247.20	-273.65	14,446,341.40	1,702,936.87	39.77901024	-80.77746998
11,912.00	92.22	329.35	11,226.15	1,328.91	-322.07	14,446,423.11	1,702,888.45	39.77923498	-80.77764160
12,006.00	91.91	329.44	11,222.76	1,409.77	-369.90	14,446,503.96	1,702,840.62	39.77945735	-80.77781111
12,101.00	91.60	329.09	11,219.86	1,491.38	-418.43	14,446,585.58	1,702,792.09	39.77968182	-80.77798312
12,196.00	91.25	328.65	11,217.49	1,572.68	-467.53	14,446,666.87	1,702,743.00	39.77990541	-80.77815716
12,290.00	92.13	330.94	11,214.72	1,653.87	-514.79	14,446,748.07	1,702,695.73	39.78012872	-80.77832469
12,385.00	92.09	331.20	11,211.22	1,736.96	-560.72	14,446,831.16	1,702,649.80	39.78035722	-80.77848742
12,479.00	91.87	330.94	11,207.97	1,819.18	-606.16	14,446,913.38	1,702,604.36	39.78058333	-80.77864845
12,573.00	91.52	330.41	11,205.19	1,901.10	-652.18	14,446,995.30	1,702,558.34	39.78080861	-80.77881152
12,668.00	90.81	330.50	11,203.26	1,983.73	-699.02	14,447,077.93	1,702,511.51	39.78103585	-80.77897750
12,763.00	90.99	331.46	11,201.77	2,066.79	-745.09	14,447,160.99	1,702,465.43	39.78126427	-80.77914079
12,857.00	89.67	332.17	11,201.23	2,149.64	-789.49	14,447,243.84	1,702,421.03	39.78149210	-80.77929808
12,952.00	90.07	329.79	11,201.44	2,232.71	-835.57	14,447,326.91	1,702,374.95	39.78172054	-80.77946138
13,046.00	89.76	329.79	11,201.58	2,313.94	-882.87	14,447,408.14	1,702,327.65	39.78194395	-80.77962903
13,140.00	91.08	329.88	11,200.90	2,395.21	-930.10	14,447,489.41	1,702,280.42	39.78216745	-80.77979643
13,235.00	91.34	329.70	11,198.89	2,477.29	-977.89	14,447,571.48	1,702,232.63	39.78239318	-80.77996582
13,328.00	91.03	329.09	11,196.97	2,557.32	-1,025.23	14,447,651.51	1,702,185.29	39.78261328	-80.78013362
13,422.00	90.81	329.09	11,195.46	2,637.95	-1,073.51	14,447,732.15	1,702,137.01	39.78283506	-80.78030477
13,517.00	90.64	328.56	11,194.25	2,719.23	-1,122.68	14,447,813.43	1,702,087.84	39.78305860	-80.78047909
13,612.00	90.59	328.74	11,193.23	2,800.35	-1,172.11	14,447,894.55	1,702,038.42	39.78328172	-80.78065431
<b>Tie Into original hole @ 13612 MD</b>									
13,706.00	88.31	327.33	11,194.14	2,880.09	-1,221.86	14,447,974.29	1,701,988.66	39.78350103	-80.78083072
13,800.00	90.99	322.67	11,194.71	2,957.06	-1,275.76	14,448,051.26	1,701,934.76	39.78371278	-80.78102190



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_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
13,895.00	91.21	323.29	11,192.89	3,032.90	-1,332.95	14,448,127.09	1,701,877.57	39.78392143	-80.78122480
13,990.00	90.95	326.36	11,191.10	3,110.53	-1,387.66	14,448,204.72	1,701,822.86	39.78413499	-80.78141887
14,084.00	92.97	328.39	11,187.88	3,189.64	-1,438.30	14,448,283.84	1,701,772.22	39.78435259	-80.78159846
14,178.00	92.53	328.39	11,183.37	3,269.60	-1,487.52	14,448,363.80	1,701,723.01	39.78457252	-80.78177294
14,273.00	91.96	329.18	11,179.65	3,350.78	-1,536.71	14,448,444.98	1,701,673.81	39.78479580	-80.78194735
14,367.00	91.12	330.50	11,177.12	3,432.03	-1,583.92	14,448,526.22	1,701,626.60	39.78501923	-80.78211469
14,462.00	90.86	330.23	11,175.48	3,514.59	-1,630.89	14,448,608.79	1,701,579.64	39.78524628	-80.78228116
14,556.00	92.66	329.62	11,172.60	3,595.89	-1,677.97	14,448,690.09	1,701,532.55	39.78546988	-80.78244805
14,651.00	92.40	329.97	11,168.40	3,677.91	-1,725.72	14,448,772.11	1,701,484.81	39.78569545	-80.78261731
14,747.00	92.18	329.70	11,164.57	3,760.85	-1,773.92	14,448,855.04	1,701,436.61	39.78592353	-80.78278817
14,841.00	91.30	331.46	11,161.71	3,842.68	-1,820.07	14,448,936.88	1,701,390.46	39.78614858	-80.78295174
14,936.00	91.38	331.81	11,159.49	3,926.25	-1,865.19	14,449,020.45	1,701,345.33	39.78637839	-80.78311164
15,030.00	90.99	332.25	11,157.55	4,009.26	-1,909.26	14,449,103.45	1,701,301.26	39.78660663	-80.78326782
15,125.00	90.55	330.14	11,156.27	4,092.49	-1,955.03	14,449,186.69	1,701,255.49	39.78683551	-80.78343002
15,219.00	90.20	330.06	11,155.65	4,173.98	-2,001.89	14,449,268.17	1,701,208.63	39.78705961	-80.78359612
15,313.00	91.65	329.79	11,154.14	4,255.31	-2,048.99	14,449,349.50	1,701,161.53	39.78728328	-80.78376308
15,407.00	91.47	329.88	11,151.58	4,336.55	-2,096.20	14,449,430.74	1,701,114.32	39.78750670	-80.78393046
15,502.00	91.34	329.79	11,149.25	4,418.66	-2,143.93	14,449,512.85	1,701,066.60	39.78773252	-80.78409963
15,596.00	91.16	329.88	11,147.20	4,499.91	-2,191.15	14,449,594.11	1,701,019.37	39.78795597	-80.78426704
15,691.00	90.81	330.14	11,145.56	4,582.18	-2,238.63	14,449,676.37	1,700,971.89	39.78818221	-80.78443535
15,785.00	90.64	330.23	11,144.38	4,663.73	-2,285.36	14,449,757.93	1,700,925.16	39.78840648	-80.78460101
15,880.00	90.33	330.14	11,143.57	4,746.15	-2,332.59	14,449,840.35	1,700,877.93	39.78863315	-80.78476844
15,974.00	91.30	330.50	11,142.23	4,827.81	-2,379.13	14,449,922.01	1,700,831.39	39.78885771	-80.78493341
16,069.00	90.81	329.53	11,140.48	4,910.08	-2,426.60	14,450,004.28	1,700,783.92	39.78908396	-80.78510169
16,163.00	91.65	327.51	11,138.47	4,990.22	-2,475.67	14,450,084.42	1,700,734.85	39.78930438	-80.78527570
16,258.00	92.40	325.57	11,135.11	5,069.42	-2,528.02	14,450,163.62	1,700,682.50	39.78952223	-80.78546135
16,353.00	93.05	326.80	11,130.59	5,148.26	-2,580.83	14,450,242.46	1,700,629.70	39.78973909	-80.78564867
16,447.00	93.49	328.74	11,125.23	5,227.64	-2,630.87	14,450,321.84	1,700,579.65	39.78995743	-80.78582616
16,542.00	92.09	330.94	11,120.61	5,309.68	-2,678.54	14,450,403.88	1,700,531.98	39.79018303	-80.78599515
16,636.00	91.78	331.11	11,117.43	5,391.87	-2,724.05	14,450,486.06	1,700,486.47	39.79040904	-80.78615646
16,731.00	91.21	330.67	11,114.95	5,474.84	-2,770.25	14,450,569.03	1,700,440.27	39.79063720	-80.78632023
16,826.00	90.73	330.50	11,113.35	5,557.58	-2,816.90	14,450,651.78	1,700,393.62	39.79086474	-80.78648560
16,920.00	92.04	330.14	11,111.07	5,639.22	-2,863.43	14,450,733.42	1,700,347.09	39.79108925	-80.78665054
17,014.00	91.65	329.53	11,108.05	5,720.45	-2,910.64	14,450,814.65	1,700,299.88	39.79131264	-80.78681792
17,109.00	91.12	329.88	11,105.75	5,802.45	-2,958.55	14,450,896.65	1,700,251.97	39.79153815	-80.78698778
17,203.00	91.52	329.70	11,103.59	5,883.66	-3,005.84	14,450,977.86	1,700,204.69	39.79176149	-80.78715542
17,298.00	91.03	329.18	11,101.47	5,965.45	-3,054.13	14,451,059.64	1,700,156.40	39.79198641	-80.78732664
17,392.00	91.08	330.32	11,099.74	6,046.63	-3,101.47	14,451,140.83	1,700,109.05	39.79220967	-80.78749450
17,487.00	90.81	330.32	11,098.17	6,129.16	-3,148.51	14,451,223.35	1,700,062.02	39.79243661	-80.78766125
17,582.00	90.68	330.85	11,096.94	6,211.90	-3,195.16	14,451,306.10	1,700,015.36	39.79266416	-80.78782663
17,671.00	90.86	329.44	11,095.74	6,289.08	-3,239.46	14,451,383.28	1,699,971.06	39.79287641	-80.78798369
17,765.00	91.30	330.58	11,093.97	6,370.48	-3,286.43	14,451,464.68	1,699,924.09	39.79310025	-80.78815024
17,860.00	91.91	332.08	11,091.31	6,453.80	-3,331.99	14,451,548.00	1,699,878.53	39.79332936	-80.78831173
17,955.00	91.52	331.99	11,088.47	6,537.67	-3,376.52	14,451,631.86	1,699,834.00	39.79355998	-80.78846955
18,049.00	90.86	331.11	11,086.51	6,620.30	-3,421.29	14,451,714.49	1,699,789.23	39.79378719	-80.78862824
18,143.00	91.74	331.46	11,084.38	6,702.71	-3,466.44	14,451,796.91	1,699,744.08	39.79401382	-80.78878829
18,238.00	91.21	331.64	11,081.94	6,786.21	-3,511.68	14,451,880.41	1,699,698.84	39.79424343	-80.78894865
18,332.00	92.00	331.55	11,079.30	6,868.86	-3,556.38	14,451,963.06	1,699,654.14	39.79447070	-80.78910709
18,426.00	91.65	330.94	11,076.31	6,951.23	-3,601.58	14,452,045.43	1,699,608.94	39.79469719	-80.78926730
18,521.00	91.03	330.85	11,074.09	7,034.21	-3,647.78	14,452,128.41	1,699,562.75	39.79492538	-80.78943107
18,615.00	90.73	330.50	11,072.64	7,116.16	-3,693.81	14,452,210.35	1,699,516.71	39.79515072	-80.78959427
18,709.00	91.52	329.97	11,070.80	7,197.74	-3,740.46	14,452,291.93	1,699,470.06	39.79537506	-80.78975969
18,804.00	90.99	330.14	11,068.72	7,280.04	-3,787.87	14,452,374.23	1,699,422.65	39.79560138	-80.78992778
18,898.00	91.82	330.50	11,066.41	7,361.68	-3,834.40	14,452,455.87	1,699,376.12	39.79582589	-80.79009276
18,993.00	91.52	330.58	11,063.64	7,444.36	-3,881.11	14,452,538.56	1,699,329.42	39.79605326	-80.79025834



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Bryan N-12HU (slot F)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Site:</b>	Bryan Pad	<b>MD Reference:</b>	RKB=1191+25 @ 1216.00usft (H&P 611)
<b>Well:</b>	Bryan N-12HU (slot F)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Sidetrack 01	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Sidetrack 01	<b>Database:</b>	DB_Aug1919_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
19,087.00	91.16	330.50	11,061.45	7,526.18	-3,927.32	14,452,620.38	1,699,283.20	39.79627826	-80.79042220
19,181.00	91.87	330.06	11,058.96	7,607.79	-3,973.91	14,452,701.98	1,699,236.61	39.79650268	-80.79058737
19,276.00	91.34	329.62	11,056.30	7,689.89	-4,021.62	14,452,784.09	1,699,188.90	39.79672847	-80.79075655
19,371.00	91.21	329.00	11,054.19	7,771.57	-4,070.09	14,452,865.76	1,699,140.43	39.79695308	-80.79092845
19,465.00	91.91	329.09	11,051.63	7,852.15	-4,118.43	14,452,946.35	1,699,092.10	39.79717469	-80.79109985
19,560.00	91.56	330.58	11,048.75	7,934.25	-4,166.14	14,453,028.44	1,699,044.38	39.79740045	-80.79126904
19,655.00	90.95	329.97	11,046.67	8,016.72	-4,213.23	14,453,110.92	1,698,997.29	39.79762726	-80.79143602
19,750.00	91.60	331.02	11,044.56	8,099.38	-4,260.01	14,453,193.58	1,698,950.51	39.79785456	-80.79160187
19,844.00	91.34	331.20	11,042.15	8,181.66	-4,305.41	14,453,275.85	1,698,905.11	39.79808080	-80.79176282
19,939.00	90.95	331.90	11,040.25	8,265.17	-4,350.66	14,453,359.36	1,698,859.87	39.79831043	-80.79192322
20,033.00	91.47	332.25	11,038.26	8,348.20	-4,394.67	14,453,442.40	1,698,815.86	39.79853875	-80.79207923
20,128.00	90.99	332.69	11,036.22	8,432.42	-4,438.57	14,453,526.62	1,698,771.96	39.79877033	-80.79223483
20,223.00	91.47	332.43	11,034.18	8,516.72	-4,482.33	14,453,610.91	1,698,728.19	39.79900209	-80.79238996
20,318.00	91.03	332.69	11,032.11	8,601.01	-4,526.10	14,453,695.20	1,698,684.42	39.79923386	-80.79254509
20,414.00	91.38	331.81	11,030.09	8,685.95	-4,570.79	14,453,780.14	1,698,639.73	39.79946741	-80.79270350
20,509.00	91.12	332.08	11,028.02	8,769.76	-4,615.46	14,453,863.96	1,698,595.06	39.79969788	-80.79286185
20,602.00	91.30	331.81	11,026.06	8,851.82	-4,659.19	14,453,946.01	1,698,551.33	39.79992350	-80.79301687
20,697.00	90.95	331.99	11,024.19	8,935.60	-4,703.93	14,454,029.80	1,698,506.60	39.80015388	-80.79317546
20,792.00	91.38	331.99	11,022.26	9,019.46	-4,748.53	14,454,113.66	1,698,461.99	39.80038445	-80.79333359
20,887.00	91.43	330.50	11,019.93	9,102.72	-4,794.22	14,454,196.91	1,698,416.30	39.80061339	-80.79349556
20,982.00	91.21	330.32	11,017.74	9,185.30	-4,841.12	14,454,279.50	1,698,369.41	39.80084050	-80.79366186
21,077.00	90.73	330.23	11,016.13	9,267.79	-4,888.21	14,454,361.99	1,698,322.31	39.80106733	-80.79382887
21,172.00	92.04	330.23	11,013.84	9,350.23	-4,935.37	14,454,444.42	1,698,275.15	39.80129402	-80.79399609
21,267.00	92.09	330.41	11,010.41	9,432.71	-4,982.38	14,454,526.91	1,698,228.15	39.80152083	-80.79416279
21,362.00	91.74	330.14	11,007.24	9,515.16	-5,029.46	14,454,609.36	1,698,181.07	39.80174757	-80.79432973
21,457.00	91.38	329.79	11,004.65	9,597.38	-5,076.99	14,454,691.57	1,698,133.53	39.80197365	-80.79449830
21,488.00	91.30	329.70	11,003.93	9,624.15	-5,092.60	14,454,718.34	1,698,117.92	39.80204726	-80.79455368
<b>Survey @ 21488.00 MD 11003.93 TVD</b>									
21,550.00	91.30	329.70	11,002.52	9,677.66	-5,123.88	14,454,771.86	1,698,086.65	39.80219443	-80.79466459
<b>Survey projected to 21550.00 MD 11002.52 TVD</b>									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
13,612.00	11,193.23	2,800.35	-1,172.11	Tie into original hole @ 13612 MD
21,488.00	11,003.93	9,624.15	-5,092.60	Survey @ 21488.00 MD 11003.93 TVD
21,550.00	11,002.52	9,677.66	-5,123.88	Survey projected to 21550.00 MD 11002.52 TVD

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 WV Department of  
 Environmental Protection