



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Ten High 1S-10HM (H)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Well:</b>	Ten High 1S-10HM (H)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

<b>Project</b>	Marshall County, West Virginia.		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD83 West Virginia - HARN		
<b>Map Zone:</b>	Zone 17N (84 W to 78 W)		

<b>Site</b>	Ten High				
<b>Site Position:</b>		<b>Northing:</b>	14,456,545.60 usft	<b>Latitude:</b>	39.80680885
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,730,001.41 usft	<b>Longitude:</b>	-80.68101011
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.20 °

<b>Well</b>	Ten High 1S-10HM (H)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,456,526.19 usft	<b>Latitude:</b>	39.80675471
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,730,086.71 usft	<b>Longitude:</b>	-80.68070666
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	0.00 usft	<b>Ground Level:</b>	1,310.00 usft	

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	9/1/2018	-8.75	66.87	52,041.04138124

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

<b>Survey Program</b>	<b>Date</b>	2/21/2019		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
221.00	17,051.00	MWD (Original Hole)	MWD	MWD - Standard
17,106.00	17,106.00	Projection (Original Hole)	MWD	MWD - Standard

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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
0.00	0.00	0.00	0.00	0.00	0.00	14,456,526.19	1,730,086.71	39.80675471	-80.68070666
221.00	0.48	270.35	221.00	0.01	-0.93	14,456,526.20	1,730,085.78	39.80675474	-80.68070996
<b>MWD surveys</b>									
242.00	0.09	7.21	242.00	0.02	-1.01	14,456,526.21	1,730,085.69	39.80675478	-80.68071026
273.00	0.56	345.48	273.00	0.19	-1.05	14,456,526.39	1,730,085.66	39.80675525	-80.68071038
302.00	0.13	272.67	302.00	0.33	-1.11	14,456,526.52	1,730,085.59	39.80675563	-80.68071063
333.00	0.81	286.39	332.99	0.40	-1.36	14,456,526.59	1,730,085.35	39.80675581	-80.68071150
364.00	0.16	45.32	363.99	0.49	-1.54	14,456,526.68	1,730,085.17	39.80675607	-80.68071214
396.00	0.12	296.05	395.99	0.53	-1.54	14,456,526.73	1,730,085.17	39.80675619	-80.68071213
427.00	0.28	141.87	426.99	0.49	-1.52	14,456,526.68	1,730,085.19	39.80675607	-80.68071207
459.00	0.12	201.20	458.99	0.40	-1.48	14,456,526.59	1,730,085.22	39.80675581	-80.68071194



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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
490.00	0.46	254.83	489.99	0.33	-1.62	14,456,526.53	1,730,085.09	39.80675564	-80.68071241
522.00	0.16	220.20	521.99	0.27	-1.77	14,456,526.46	1,730,084.94	39.80675546	-80.68071296
553.00	0.45	354.85	552.99	0.35	-1.81	14,456,526.55	1,730,084.90	39.80675570	-80.68071309
585.00	0.72	220.94	584.99	0.33	-1.95	14,456,526.52	1,730,084.76	39.80675563	-80.68071360
616.00	0.19	197.99	615.99	0.13	-2.09	14,456,526.32	1,730,084.61	39.80675509	-80.68071412
648.00	0.69	184.85	647.99	-0.11	-2.13	14,456,526.08	1,730,084.58	39.80675443	-80.68071424
679.00	0.36	217.31	678.99	-0.38	-2.20	14,456,525.82	1,730,084.50	39.80675370	-80.68071451
711.00	0.19	344.55	710.99	-0.40	-2.28	14,456,525.79	1,730,084.43	39.80675362	-80.68071477
743.00	0.10	295.86	742.99	-0.34	-2.32	14,456,525.85	1,730,084.39	39.80675380	-80.68071491
774.00	0.11	262.20	773.99	-0.33	-2.37	14,456,525.86	1,730,084.34	39.80675382	-80.68071510
805.00	0.40	130.18	804.99	-0.41	-2.32	14,456,525.79	1,730,084.39	39.80675362	-80.68071491
837.00	0.26	112.55	836.99	-0.51	-2.16	14,456,525.69	1,730,084.54	39.80675334	-80.68071437
868.00	0.29	194.77	867.99	-0.61	-2.12	14,456,525.58	1,730,084.59	39.80675306	-80.68071421
900.00	0.18	207.73	899.99	-0.73	-2.16	14,456,525.46	1,730,084.54	39.80675272	-80.68071437
931.00	0.33	162.99	930.99	-0.86	-2.16	14,456,525.33	1,730,084.55	39.80675237	-80.68071436
963.00	0.19	285.70	962.99	-0.93	-2.18	14,456,525.26	1,730,084.52	39.80675217	-80.68071445
994.00	0.18	177.35	993.99	-0.97	-2.23	14,456,525.22	1,730,084.47	39.80675207	-80.68071462
1,026.00	0.28	139.48	1,025.99	-1.08	-2.18	14,456,525.11	1,730,084.53	39.80675177	-80.68071443
1,057.00	0.24	209.87	1,056.99	-1.19	-2.16	14,456,525.00	1,730,084.54	39.80675146	-80.68071437
1,089.00	0.19	218.84	1,088.99	-1.29	-2.23	14,456,524.90	1,730,084.48	39.80675118	-80.68071461
1,120.00	0.31	153.33	1,119.99	-1.41	-2.22	14,456,524.78	1,730,084.48	39.80675087	-80.68071459
1,155.00	0.38	144.27	1,154.98	-1.59	-2.11	14,456,524.61	1,730,084.59	39.80675038	-80.68071420
1,189.00	0.06	156.70	1,188.98	-1.69	-2.04	14,456,524.50	1,730,084.67	39.80675008	-80.68071394
1,284.00	0.56	81.01	1,283.98	-1.67	-1.56	14,456,524.53	1,730,085.14	39.80675015	-80.68071224
1,379.00	1.77	64.19	1,378.96	-0.96	0.22	14,456,525.24	1,730,086.92	39.80675209	-80.68070590
1,473.00	1.91	58.81	1,472.91	0.49	2.87	14,456,526.68	1,730,089.57	39.80675602	-80.68069645
1,568.00	2.91	47.29	1,567.83	2.94	5.99	14,456,529.14	1,730,092.70	39.80676274	-80.68068529
1,663.00	4.93	44.78	1,662.60	7.48	10.64	14,456,533.67	1,730,097.35	39.80677514	-80.68066868
1,757.00	5.69	43.93	1,756.20	13.70	16.72	14,456,539.89	1,730,103.42	39.80679217	-80.68064696
1,852.00	4.24	42.28	1,850.84	19.69	22.35	14,456,545.88	1,730,109.05	39.80680857	-80.68062684
1,947.00	3.99	34.94	1,945.59	25.00	26.60	14,456,551.19	1,730,113.31	39.80682310	-80.68061162
2,041.00	3.88	35.56	2,039.37	30.27	30.33	14,456,556.46	1,730,117.03	39.80683753	-80.68059829
2,136.00	4.22	30.32	2,134.14	35.90	33.96	14,456,562.09	1,730,120.67	39.80685296	-80.68058528
2,231.00	4.24	37.06	2,228.88	41.72	37.84	14,456,567.91	1,730,124.55	39.80686891	-80.68057139
2,325.00	4.47	44.72	2,322.61	47.09	42.51	14,456,573.29	1,730,129.22	39.80688363	-80.68055469
2,420.00	4.96	51.90	2,417.29	52.26	48.35	14,456,578.45	1,730,135.06	39.80689775	-80.68053384
2,514.00	3.92	53.99	2,511.00	56.66	54.15	14,456,582.85	1,730,140.85	39.80690977	-80.68051314
2,609.00	3.39	52.05	2,605.81	60.29	58.99	14,456,586.48	1,730,145.69	39.80691971	-80.68049586
2,704.00	3.51	48.54	2,700.64	63.94	63.38	14,456,590.14	1,730,150.09	39.80692970	-80.68048016
2,798.00	3.67	44.05	2,794.45	68.01	67.63	14,456,594.20	1,730,154.34	39.80694083	-80.68046498
2,849.00	3.85	42.12	2,845.34	70.46	69.91	14,456,596.65	1,730,156.62	39.80694751	-80.68045682
2,979.00	3.96	32.81	2,975.04	77.47	75.27	14,456,603.66	1,730,161.98	39.80696671	-80.68043765
3,074.00	3.77	24.08	3,069.83	83.07	78.32	14,456,609.27	1,730,165.03	39.80698208	-80.68042671
3,168.00	3.18	16.15	3,163.65	88.40	80.31	14,456,614.59	1,730,167.02	39.80699669	-80.68041957
3,263.00	5.27	42.22	3,258.40	94.16	83.98	14,456,620.35	1,730,170.68	39.80701248	-80.68040645
3,358.00	7.87	45.86	3,352.77	101.92	91.58	14,456,628.12	1,730,178.28	39.80703372	-80.68037929
3,453.00	10.37	43.17	3,446.56	112.69	102.10	14,456,638.88	1,730,188.80	39.80706319	-80.68034169
3,548.00	11.94	43.44	3,539.76	126.06	114.70	14,456,652.26	1,730,201.41	39.80709979	-80.68029663
3,643.00	14.30	42.38	3,632.28	141.87	129.37	14,456,668.06	1,730,216.08	39.80714305	-80.68024420
3,741.00	17.44	39.56	3,726.53	162.14	146.89	14,456,688.33	1,730,233.59	39.80719854	-80.68018158
3,835.00	19.84	32.17	3,815.60	186.51	164.36	14,456,712.70	1,730,251.06	39.80726529	-80.68011906
3,930.00	22.96	42.06	3,904.07	213.92	185.36	14,456,740.12	1,730,272.07	39.80734038	-80.68004391
4,025.00	24.73	51.60	3,990.99	240.04	213.36	14,456,766.23	1,730,300.07	39.80741182	-80.67994388
4,119.00	28.31	52.35	4,075.09	265.87	246.43	14,456,792.06	1,730,333.14	39.80748244	-80.67982581
4,214.00	32.91	48.24	4,156.84	296.84	283.54	14,456,823.03	1,730,370.25	39.80756713	-80.67969327



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4,309.00	37.77	46.01	4,234.31	334.26	323.75	14,456,860.45	1,730,410.46	39.80766949	-80.67954962
4,403.00	42.28	49.01	4,306.28	375.02	368.36	14,456,901.21	1,730,455.06	39.80778099	-80.67939027
4,498.00	43.21	45.62	4,376.06	418.73	415.73	14,456,944.92	1,730,502.43	39.80790057	-80.67922103
4,593.00	44.10	42.12	4,444.80	466.01	461.15	14,456,992.20	1,730,547.86	39.80802994	-80.67905869
4,687.00	45.37	40.27	4,511.58	515.79	504.71	14,457,041.98	1,730,591.42	39.80816624	-80.67890295
4,782.00	45.05	41.02	4,578.51	566.95	548.62	14,457,093.14	1,730,635.33	39.80830629	-80.67874592
4,877.00	44.11	43.11	4,646.17	616.45	593.29	14,457,142.64	1,730,679.99	39.80844180	-80.67858626
4,971.00	42.72	45.06	4,714.46	662.86	638.22	14,457,189.05	1,730,724.92	39.80856881	-80.67842568
5,066.00	42.13	46.40	4,784.58	707.60	684.10	14,457,233.79	1,730,770.81	39.80869122	-80.67826171
5,160.00	43.32	45.80	4,853.64	751.82	730.05	14,457,278.02	1,730,816.76	39.80881222	-80.67809752
5,255.00	43.83	45.11	4,922.46	797.76	776.72	14,457,323.95	1,730,863.43	39.80893791	-80.67793076
5,350.00	44.94	43.35	4,990.36	845.38	823.06	14,457,371.57	1,730,909.77	39.80906822	-80.67776514
5,445.00	46.31	41.43	5,056.80	895.53	868.83	14,457,421.72	1,730,955.53	39.80920550	-80.67760154
5,539.00	45.99	40.36	5,121.92	946.77	913.21	14,457,472.96	1,730,999.91	39.80934578	-80.67744285
5,634.00	43.61	39.51	5,189.32	998.09	956.18	14,457,524.28	1,731,042.89	39.80948628	-80.67728917
5,731.00	41.67	44.36	5,260.69	1,046.97	1,000.02	14,457,573.16	1,731,086.73	39.80962009	-80.67713242
5,825.00	43.52	45.77	5,329.89	1,091.89	1,045.07	14,457,618.08	1,731,131.77	39.80974300	-80.67697145
5,919.00	42.12	43.55	5,398.84	1,137.32	1,089.98	14,457,663.51	1,731,176.69	39.80988731	-80.67681094
6,014.00	42.46	46.01	5,469.12	1,182.68	1,135.00	14,457,708.87	1,731,221.71	39.80999144	-80.67665003
6,109.00	40.90	45.97	5,540.07	1,226.57	1,180.44	14,457,752.76	1,731,267.14	39.81011152	-80.67648768
6,203.00	42.03	45.22	5,610.51	1,270.12	1,224.90	14,457,796.32	1,731,311.61	39.81023070	-80.67632880
6,298.00	43.60	44.64	5,680.20	1,315.84	1,270.49	14,457,842.03	1,731,357.20	39.81035578	-80.67616585
6,392.00	43.48	42.47	5,748.34	1,362.76	1,315.11	14,457,888.95	1,731,401.81	39.81048419	-80.67600639
6,486.00	42.85	42.76	5,816.90	1,410.08	1,358.64	14,457,936.27	1,731,445.35	39.81061372	-80.67585074
6,580.00	43.35	42.72	5,885.54	1,457.25	1,402.23	14,457,983.44	1,731,488.94	39.81074283	-80.67569491
6,675.00	43.16	41.40	5,954.73	1,505.58	1,445.84	14,458,031.77	1,731,532.55	39.81087512	-80.67553900
6,695.00	42.68	40.97	5,969.38	1,515.83	1,454.81	14,458,042.02	1,731,541.52	39.81090318	-80.67550693
6,789.00	41.10	41.06	6,039.35	1,563.19	1,496.00	14,458,089.38	1,731,582.71	39.81103282	-80.67535966
6,883.00	36.57	55.65	6,112.71	1,602.39	1,539.53	14,458,128.58	1,731,626.23	39.81114004	-80.67520415
6,978.00	36.48	77.18	6,189.37	1,624.72	1,590.64	14,458,150.91	1,731,677.35	39.81120085	-80.67502185
7,072.00	32.22	82.19	6,266.97	1,634.33	1,642.75	14,458,160.52	1,731,729.46	39.81122672	-80.67483617
7,167.00	27.56	89.31	6,349.34	1,638.04	1,689.86	14,458,164.23	1,731,776.56	39.81123644	-80.67466838
7,262.00	28.70	100.30	6,433.17	1,634.22	1,734.31	14,458,160.41	1,731,821.01	39.81122552	-80.67451014
7,356.00	31.12	104.17	6,514.65	1,624.24	1,780.08	14,458,150.43	1,731,866.78	39.81119764	-80.67434729
7,451.00	36.53	108.82	6,593.56	1,609.09	1,830.69	14,458,135.28	1,731,917.39	39.81115554	-80.67416726
7,545.00	48.00	113.83	6,663.03	1,585.87	1,889.33	14,458,112.06	1,731,976.04	39.81109118	-80.67395874
7,638.00	56.79	122.62	6,719.79	1,550.82	1,953.92	14,458,077.02	1,732,040.62	39.81099429	-80.67372921
7,733.00	59.08	137.74	6,770.43	1,499.02	2,015.06	14,458,025.21	1,732,101.76	39.81085141	-80.67351217
7,827.00	63.47	143.54	6,815.63	1,435.28	2,067.22	14,457,961.48	1,732,153.93	39.81067586	-80.67332725
7,922.00	70.15	148.02	6,853.03	1,363.09	2,116.21	14,457,889.29	1,732,202.92	39.81047712	-80.67315372
8,017.00	75.65	151.01	6,880.96	1,284.87	2,162.22	14,457,811.06	1,732,248.93	39.81026183	-80.67299090
8,111.00	79.78	152.15	6,900.96	1,204.11	2,205.92	14,457,730.30	1,732,292.63	39.81003960	-80.67283635
8,204.00	83.69	153.38	6,914.32	1,122.29	2,248.03	14,457,648.48	1,732,334.73	39.80981449	-80.67268749
8,299.00	85.45	152.94	6,923.31	1,037.91	2,290.72	14,457,564.10	1,732,377.43	39.80958233	-80.67253654
8,393.00	86.07	154.18	6,930.26	953.97	2,332.46	14,457,480.17	1,732,419.17	39.80935140	-80.67238901
8,487.00	87.74	150.40	6,935.34	870.89	2,376.10	14,457,397.09	1,732,462.81	39.80912281	-80.67223471
8,582.00	88.48	149.69	6,938.47	788.63	2,423.51	14,457,314.82	1,732,510.22	39.80889642	-80.67206697
8,676.00	88.22	150.31	6,941.18	707.26	2,470.49	14,457,233.45	1,732,557.20	39.80867248	-80.67190074
8,771.00	90.51	149.34	6,942.23	625.14	2,518.24	14,457,151.34	1,732,604.94	39.80844649	-80.67173180
8,865.00	90.64	148.99	6,941.29	544.44	2,566.41	14,457,070.63	1,732,653.12	39.80822436	-80.67156130
8,960.00	90.55	149.25	6,940.30	462.91	2,615.17	14,456,989.10	1,732,701.88	39.80799997	-80.67138876
9,055.00	89.85	148.55	6,939.97	381.56	2,664.24	14,456,907.75	1,732,750.95	39.80777608	-80.67121510
9,149.00	88.09	148.37	6,941.66	301.46	2,713.40	14,456,827.66	1,732,800.11	39.80755562	-80.67104110
9,244.00	87.96	148.55	6,944.94	220.55	2,763.06	14,456,746.74	1,732,849.77	39.80733290	-80.67086532
9,339.00	89.41	151.01	6,947.12	138.49	2,810.86	14,456,664.68	1,732,897.57	39.80710706	-80.67069620



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Ten High 1S-10HM (H)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Well:</b>	Ten High 1S-10HM (H)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,432.00	89.63	151.01	6,947.90	57.14	2,855.93	14,456,583.33	1,732,942.64	39.80688321	-80.67053678
9,527.00	90.07	148.64	6,948.14	-24.98	2,903.68	14,456,501.21	1,732,990.39	39.80665721	-80.67036784
9,622.00	90.42	148.90	6,947.74	-106.21	2,952.94	14,456,419.98	1,733,039.64	39.80643362	-80.67019352
9,717.00	90.42	148.81	6,947.04	-187.52	3,002.07	14,456,338.68	1,733,088.78	39.80620984	-80.67001964
9,812.00	91.08	150.66	6,945.80	-269.56	3,049.94	14,456,256.64	1,733,136.65	39.80598405	-80.66985026
9,906.00	90.86	149.87	6,944.21	-351.17	3,096.56	14,456,175.03	1,733,183.26	39.80575946	-80.66968535
10,001.00	89.80	152.42	6,943.66	-434.36	3,142.40	14,456,091.83	1,733,229.11	39.80553052	-80.66952322
10,096.00	89.80	150.13	6,943.99	-517.67	3,188.05	14,456,008.53	1,733,274.76	39.80530129	-80.66936176
10,190.00	90.11	149.34	6,944.06	-598.85	3,235.43	14,455,927.34	1,733,322.14	39.80507785	-80.66919414
10,285.00	90.73	150.31	6,943.37	-680.98	3,283.18	14,455,845.22	1,733,369.88	39.80485183	-80.66902520
10,380.00	91.08	150.40	6,941.87	-763.53	3,330.16	14,455,762.66	1,733,416.87	39.80462464	-80.66885900
10,474.00	91.12	153.21	6,940.06	-846.35	3,374.56	14,455,679.84	1,733,461.27	39.80439674	-80.66870200
10,569.00	90.59	154.18	6,938.65	-931.51	3,416.66	14,455,594.69	1,733,503.36	39.80416246	-80.66855325
10,663.00	89.76	154.44	6,938.36	-1,016.21	3,457.40	14,455,509.98	1,733,544.11	39.80392942	-80.66840928
10,758.00	88.00	154.97	6,940.22	-1,102.08	3,497.99	14,455,424.11	1,733,584.69	39.80369318	-80.66826591
10,853.00	88.26	155.41	6,943.32	-1,188.27	3,537.83	14,455,337.92	1,733,624.53	39.80345609	-80.66812519
10,947.00	88.26	152.51	6,946.17	-1,272.68	3,579.07	14,455,253.51	1,733,665.78	39.80322386	-80.66797946
11,042.00	88.92	149.87	6,948.51	-1,355.89	3,624.83	14,455,170.30	1,733,711.54	39.80299489	-80.66781762
11,136.00	89.23	149.43	6,950.03	-1,436.99	3,672.32	14,455,089.20	1,733,759.03	39.80277166	-80.66764961
11,231.00	89.01	149.69	6,951.48	-1,518.89	3,720.45	14,455,007.30	1,733,807.15	39.80254627	-80.66747934
11,326.00	88.97	150.31	6,953.16	-1,601.15	3,767.94	14,454,925.04	1,733,854.65	39.80231988	-80.66731134
11,421.00	92.70	152.77	6,951.77	-1,684.64	3,813.20	14,454,841.55	1,733,899.90	39.80209014	-80.66715131
11,516.00	89.41	148.02	6,950.02	-1,767.19	3,860.10	14,454,759.01	1,733,946.81	39.80186296	-80.66698539
11,610.00	89.80	148.02	6,950.67	-1,846.92	3,909.89	14,454,679.27	1,733,996.59	39.80164349	-80.66680920
11,705.00	90.24	149.52	6,950.64	-1,928.15	3,959.14	14,454,598.04	1,734,045.85	39.80141991	-80.66663491
11,799.00	90.37	149.69	6,950.14	-2,009.23	4,006.70	14,454,516.96	1,734,093.41	39.80119676	-80.66646666
11,894.00	90.90	149.69	6,949.09	-2,091.24	4,054.64	14,454,434.96	1,734,141.35	39.80097105	-80.66629705
11,989.00	91.34	150.84	6,947.23	-2,173.71	4,101.75	14,454,352.48	1,734,188.46	39.80074407	-80.66613042
12,083.00	90.86	148.46	6,945.42	-2,254.81	4,149.23	14,454,271.38	1,734,235.94	39.80052088	-80.66596244
12,178.00	90.11	147.58	6,944.62	-2,335.39	4,199.55	14,454,190.81	1,734,286.25	39.80029907	-80.66578438
12,272.00	90.81	149.60	6,943.87	-2,415.60	4,248.53	14,454,110.59	1,734,335.24	39.80007827	-80.66561104
12,366.00	91.56	148.20	6,941.92	-2,496.07	4,297.07	14,454,030.12	1,734,383.78	39.79985679	-80.66543929
12,461.00	91.25	144.42	6,939.59	-2,575.08	4,349.74	14,453,951.11	1,734,436.45	39.79963928	-80.66525281
12,554.00	93.10	147.85	6,936.06	-2,652.23	4,401.52	14,453,873.96	1,734,488.23	39.79942687	-80.66506950
12,649.00	92.75	150.40	6,931.21	-2,733.66	4,450.20	14,453,792.54	1,734,536.91	39.79920276	-80.66489725
12,743.00	91.34	149.60	6,927.86	-2,815.01	4,497.17	14,453,711.19	1,734,583.88	39.79897886	-80.66473112
12,837.00	91.12	148.64	6,925.84	-2,895.66	4,545.41	14,453,630.53	1,734,632.11	39.79875687	-80.66456047
12,932.00	89.27	151.19	6,925.52	-2,977.85	4,593.02	14,453,548.34	1,734,679.73	39.79853066	-80.66439204
13,026.00	89.49	150.57	6,926.53	-3,059.97	4,638.76	14,453,466.23	1,734,725.47	39.79830468	-80.66423029
13,121.00	89.54	150.48	6,927.34	-3,142.67	4,685.50	14,453,383.52	1,734,772.21	39.79807709	-80.66406497
13,216.00	88.62	153.12	6,928.86	-3,226.37	4,730.39	14,453,299.82	1,734,817.09	39.79784675	-80.66390630
13,310.00	88.79	153.65	6,930.99	-3,310.39	4,772.49	14,453,215.80	1,734,859.19	39.79761558	-80.66375754
13,405.00	89.45	154.26	6,932.45	-3,395.73	4,814.19	14,453,130.46	1,734,900.90	39.79738078	-80.66361019
13,499.00	89.89	153.03	6,932.99	-3,479.96	4,855.92	14,453,046.23	1,734,942.63	39.79714905	-80.66346276
13,593.00	89.32	152.07	6,933.64	-3,563.37	4,899.25	14,452,962.82	1,734,985.96	39.79691952	-80.66330961
13,688.00	88.53	150.57	6,935.42	-3,646.70	4,944.83	14,452,879.49	1,735,031.54	39.79669022	-80.66314845
13,782.00	88.44	150.48	6,937.90	-3,728.50	4,991.07	14,452,797.69	1,735,077.78	39.79646508	-80.66298494
13,877.00	88.31	150.22	6,940.60	-3,811.03	5,038.05	14,452,715.16	1,735,124.75	39.79623796	-80.66281879
13,972.00	88.66	150.13	6,943.11	-3,893.42	5,085.28	14,452,632.77	1,735,171.99	39.79601121	-80.66265175
14,067.00	88.92	150.31	6,945.12	-3,975.86	5,132.45	14,452,550.34	1,735,219.16	39.79578433	-80.66248491
14,161.00	90.11	149.52	6,945.91	-4,057.19	5,179.57	14,452,469.00	1,735,266.28	39.79556049	-80.66231826
14,256.00	89.85	146.26	6,945.95	-4,137.64	5,230.06	14,452,388.55	1,735,316.77	39.79533901	-80.66213959
14,351.00	89.71	142.93	6,946.31	-4,215.06	5,285.09	14,452,311.13	1,735,371.80	39.79512582	-80.66194471
14,446.00	90.86	141.78	6,945.84	-4,290.28	5,343.11	14,452,235.91	1,735,429.82	39.79491865	-80.66173917
14,540.00	92.26	147.93	6,943.28	-4,367.08	5,397.18	14,452,159.11	1,735,483.88	39.79470719	-80.66154773



Survey Report - Geographic



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Ten High 1S-10HM (H)
<b>Project:</b>	Marshall County, West Virginia.	<b>TVD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Site:</b>	Ten High	<b>MD Reference:</b>	RKB=1310+33 @ 1343.00usft (Nabors X08)
<b>Well:</b>	Ten High 1S-10HM (H)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Jul2216dt_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,635.00	92.75	148.90	6,939.12	-4,447.93	5,446.89	14,452,078.26	1,735,533.59	39.79448465	-80.66137185
14,729.00	89.58	151.36	6,937.21	-4,529.41	5,493.68	14,451,996.78	1,735,580.39	39.79426040	-80.66120635
14,824.00	89.58	151.01	6,937.91	-4,612.64	5,539.47	14,451,913.55	1,735,626.17	39.79403134	-80.66104447
14,919.00	89.49	149.96	6,938.68	-4,695.31	5,586.27	14,451,830.88	1,735,672.97	39.79380383	-80.66087897
15,014.00	90.02	152.42	6,939.09	-4,778.54	5,632.04	14,451,747.65	1,735,718.75	39.79357477	-80.66071713
15,109.00	90.24	152.42	6,938.87	-4,862.75	5,676.03	14,451,663.44	1,735,762.73	39.79334307	-80.66056168
15,204.00	90.20	152.59	6,938.51	-4,947.02	5,719.89	14,451,579.18	1,735,806.59	39.79311119	-80.66040669
15,298.00	89.98	152.07	6,938.36	-5,030.27	5,763.54	14,451,495.93	1,735,850.24	39.79288211	-80.66025241
15,393.00	88.62	151.63	6,939.52	-5,114.02	5,808.35	14,451,412.17	1,735,895.06	39.79265163	-80.66009400
15,488.00	88.84	151.80	6,941.62	-5,197.66	5,853.36	14,451,328.53	1,735,940.06	39.79242148	-80.65993492
15,582.00	88.79	151.98	6,943.57	-5,280.55	5,897.64	14,451,245.64	1,735,984.34	39.79219336	-80.65977840
15,676.00	89.23	152.33	6,945.19	-5,363.66	5,941.54	14,451,162.54	1,736,028.24	39.79196468	-80.65962325
15,771.00	88.18	151.98	6,947.34	-5,447.63	5,985.90	14,451,078.56	1,736,072.60	39.79173360	-80.65946647
15,866.00	88.04	150.57	6,950.47	-5,530.89	6,031.53	14,450,995.30	1,736,118.23	39.79150446	-80.65930515
15,961.00	88.22	150.22	6,953.57	-5,613.45	6,078.44	14,450,912.74	1,736,165.14	39.79127726	-80.65913929
16,055.00	90.29	150.13	6,954.80	-5,694.99	6,125.18	14,450,831.21	1,736,211.89	39.79105285	-80.65897399
16,150.00	90.64	150.13	6,954.02	-5,777.36	6,172.49	14,450,748.83	1,736,259.20	39.79082613	-80.65880668
16,245.00	90.99	149.78	6,952.67	-5,859.59	6,220.05	14,450,666.60	1,736,306.76	39.79059981	-80.65863849
16,340.00	89.67	149.25	6,952.13	-5,941.45	6,268.24	14,450,584.74	1,736,354.95	39.79037449	-80.65846804
16,434.00	89.93	148.90	6,952.45	-6,022.09	6,316.55	14,450,504.10	1,736,403.26	39.79015254	-80.65829717
16,529.00	90.11	148.55	6,952.42	-6,103.29	6,365.87	14,450,422.91	1,736,452.58	39.78992904	-80.65812270
16,623.00	89.19	149.43	6,953.00	-6,183.85	6,414.30	14,450,342.34	1,736,501.00	39.78970729	-80.65795141
16,718.00	88.97	150.31	6,954.52	-6,266.00	6,461.98	14,450,260.19	1,736,548.68	39.78948118	-80.65778280
16,812.00	89.19	150.40	6,956.03	-6,347.69	6,508.46	14,450,178.51	1,736,595.17	39.78925636	-80.65761842
16,906.00	89.41	150.04	6,957.18	-6,429.27	6,555.15	14,450,096.93	1,736,641.85	39.78903183	-80.65745335
17,001.00	89.85	150.31	6,957.79	-6,511.68	6,602.40	14,450,014.51	1,736,689.10	39.78880500	-80.65728628
17,051.00	90.07	150.31	6,957.83	-6,555.12	6,627.16	14,449,971.08	1,736,713.87	39.78868546	-80.65719871
<b>Survey @ 17051.00 MD 6957.83 TVD</b>									
17,106.00	90.07	150.31	6,957.76	-6,602.90	6,654.40	14,449,923.30	1,736,741.11	39.78855396	-80.65710239
<b>Survey projected to 17106.00 MD 6957.76 TVD</b>									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
221.00	221.00	0.01	-0.93	MWD surveys
17,051.00	6,957.83	-6,555.12	6,627.16	Survey @ 17051.00 MD 6957.83 TVD