



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Ten High 1N-19HM (R)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Well:	Ten High 1N-19HM (R)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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

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

Well	Ten High 1N-19HM (R)					
Well Position	+N/-S	0.00 usft	Northing:	14,456,551.15 usft	Latitude:	39.80682433
	+E/-W	0.00 usft	Easting:	1,729,977.05 usft	Longitude:	-80.68109681
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,310.00 usft	

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/7/2019	-8.76	66.82	51,981.78049526

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	343.48	

Survey Program	Date 3/22/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
225.00	2,791.00	MWD surf (Original Hole)	MWD	MWD - Standard
2,889.00	18,261.00	MWD (Original Hole)	MWD	MWD - Standard
18,318.00	18,318.00	Projection (Original Hole)	MWD	MWD - Standard

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,456,551.15	1,729,977.05	39.80682433	-80.68109681	
225.00	0.34	236.10	225.00	-0.37	-0.55	14,456,550.78	1,729,976.49	39.80682331	-80.68109879	
MWD surveys										
256.00	0.43	316.10	256.00	-0.34	-0.71	14,456,550.81	1,729,976.34	39.80682341	-80.68109935	
288.00	0.92	257.67	288.00	-0.31	-1.05	14,456,550.84	1,729,976.00	39.80682350	-80.68110054	
319.00	0.53	227.22	318.99	-0.46	-1.39	14,456,550.69	1,729,975.65	39.80682309	-80.68110178	
346.00	0.69	284.69	345.99	-0.50	-1.64	14,456,550.65	1,729,975.40	39.80682297	-80.68110267	
375.00	0.42	228.26	374.99	-0.53	-1.89	14,456,550.62	1,729,975.16	39.80682290	-80.68110355	
405.00	0.49	232.14	404.99	-0.68	-2.07	14,456,550.47	1,729,974.97	39.80682248	-80.68110420	
434.00	0.25	227.10	433.99	-0.80	-2.22	14,456,550.35	1,729,974.83	39.80682216	-80.68110472	

RECEIVED
Office of Oil and Gas
JUN 10 2020
WV Department of
Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Ten High 1N-19HM (R)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Well:	Ten High 1N-19HM (R)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
465.00	0.56	244.62	464.99	-0.91	-2.40	14,456,550.24	1,729,974.64	39.80682185	-80.68110538
495.00	0.16	135.20	494.99	-1.00	-2.51	14,456,550.15	1,729,974.54	39.80682160	-80.68110575
526.00	0.59	196.38	525.99	-1.19	-2.52	14,456,549.96	1,729,974.52	39.80682110	-80.68110581
557.00	0.13	199.03	556.99	-1.37	-2.58	14,456,549.78	1,729,974.47	39.80682058	-80.68110601
588.00	0.20	261.95	587.99	-1.41	-2.64	14,456,549.74	1,729,974.40	39.80682047	-80.68110624
620.00	0.15	216.31	619.99	-1.46	-2.72	14,456,549.70	1,729,974.32	39.80682036	-80.68110653
651.00	0.29	145.84	650.99	-1.55	-2.70	14,456,549.60	1,729,974.34	39.80682009	-80.68110646
683.00	0.19	267.65	682.99	-1.62	-2.71	14,456,549.53	1,729,974.33	39.80681990	-80.68110649
714.00	0.17	262.67	713.99	-1.63	-2.81	14,456,549.52	1,729,974.24	39.80681988	-80.68110683
746.00	0.24	234.35	745.99	-1.68	-2.91	14,456,549.48	1,729,974.14	39.80681976	-80.68110719
777.00	0.40	220.30	776.99	-1.80	-3.03	14,456,549.36	1,729,974.01	39.80681943	-80.68110763
809.00	0.19	210.25	808.99	-1.93	-3.13	14,456,549.22	1,729,973.91	39.80681907	-80.68110799
840.00	0.35	215.23	839.98	-2.05	-3.21	14,456,549.10	1,729,973.83	39.80681874	-80.68110827
872.00	0.23	222.73	871.98	-2.18	-3.31	14,456,548.98	1,729,973.73	39.80681839	-80.68110863
903.00	0.12	192.82	902.98	-2.25	-3.36	14,456,548.90	1,729,973.68	39.80681818	-80.68110881
935.00	0.20	225.75	934.98	-2.33	-3.41	14,456,548.83	1,729,973.64	39.80681798	-80.68110898
969.00	0.13	222.76	968.98	-2.39	-3.48	14,456,548.76	1,729,973.57	39.80681779	-80.68110922
998.00	0.06	179.51	997.98	-2.43	-3.50	14,456,548.72	1,729,973.55	39.80681768	-80.68110930
1,029.00	0.17	200.53	1,028.98	-2.49	-3.52	14,456,548.66	1,729,973.53	39.80681752	-80.68110936
1,061.00	0.13	171.10	1,060.98	-2.57	-3.53	14,456,548.58	1,729,973.52	39.80681730	-80.68110940
1,092.00	0.16	145.26	1,091.98	-2.64	-3.50	14,456,548.51	1,729,973.55	39.80681710	-80.68110930
1,124.00	0.16	181.67	1,123.98	-2.73	-3.47	14,456,548.43	1,729,973.57	39.80681688	-80.68110921
1,149.00	0.20	109.67	1,148.98	-2.78	-3.43	14,456,548.38	1,729,973.61	39.80681674	-80.68110907
1,281.00	0.43	303.22	1,280.98	-2.58	-3.63	14,456,548.57	1,729,973.42	39.80681728	-80.68110977
1,375.00	1.34	306.00	1,374.97	-1.74	-4.81	14,456,549.41	1,729,972.23	39.80681960	-80.68111397
1,470.00	1.71	309.66	1,469.94	-0.18	-6.80	14,456,550.97	1,729,970.24	39.80682389	-80.68112104
1,565.00	2.01	307.68	1,564.89	1.74	-9.21	14,456,552.89	1,729,967.83	39.80682920	-80.68112960
1,660.00	2.34	315.30	1,659.82	4.14	-11.90	14,456,555.29	1,729,965.15	39.80683581	-80.68113912
1,754.00	2.53	347.49	1,753.74	7.53	-13.70	14,456,558.68	1,729,963.35	39.80684513	-80.68114548
1,849.00	3.00	3.43	1,848.63	12.05	-14.00	14,456,563.21	1,729,963.04	39.80685757	-80.68114651
1,943.00	4.26	9.83	1,942.44	17.95	-13.26	14,456,569.10	1,729,963.79	39.80687376	-80.68114379
2,038.00	4.96	15.46	2,037.13	25.38	-11.56	14,456,576.54	1,729,965.49	39.80689416	-80.68113765
2,133.00	5.34	31.83	2,131.75	33.10	-8.13	14,456,584.25	1,729,968.91	39.80691531	-80.68112536
2,228.00	5.09	43.48	2,226.36	39.91	-2.90	14,456,591.06	1,729,974.14	39.80693397	-80.68110664
2,322.00	5.73	49.55	2,319.94	45.98	3.54	14,456,597.14	1,729,980.58	39.80695058	-80.68108363
2,417.00	5.51	51.51	2,414.49	51.90	10.72	14,456,603.05	1,729,987.76	39.80696675	-80.68105800
2,512.00	3.46	49.75	2,509.19	56.59	16.47	14,456,607.74	1,729,993.52	39.80697958	-80.68103743
2,606.00	2.68	44.45	2,603.05	59.99	20.18	14,456,611.14	1,729,997.22	39.80698889	-80.68102420
2,701.00	3.04	36.39	2,697.94	63.60	23.23	14,456,614.76	1,730,000.27	39.80699878	-80.68101329
2,791.00	4.01	35.16	2,787.77	68.10	26.46	14,456,619.25	1,730,003.50	39.80701109	-80.68100174
2,889.00	4.57	21.16	2,885.49	74.54	29.84	14,456,625.69	1,730,006.89	39.80702875	-80.68098962
2,983.00	4.34	15.02	2,979.21	81.47	32.11	14,456,632.62	1,730,009.16	39.80704775	-80.68098143
3,078.00	4.94	42.23	3,073.91	87.97	35.79	14,456,639.12	1,730,012.84	39.80706557	-80.68096824
3,172.00	8.69	51.38	3,167.23	95.40	44.07	14,456,646.55	1,730,021.11	39.80708590	-80.68093870
3,267.00	11.22	45.38	3,260.80	106.38	56.25	14,456,657.53	1,730,033.30	39.80711591	-80.68089516
3,362.00	10.59	40.14	3,354.08	119.54	68.46	14,456,670.69	1,730,045.51	39.80715195	-80.68085153
3,457.00	12.70	38.42	3,447.12	134.40	80.58	14,456,685.55	1,730,057.62	39.80719263	-80.68080819
3,552.00	15.96	41.58	3,539.15	152.35	95.74	14,456,703.51	1,730,072.79	39.80724180	-80.68075397
3,647.00	20.06	42.71	3,629.48	174.11	115.47	14,456,725.26	1,730,092.51	39.80730134	-80.68068345
3,742.00	18.32	58.21	3,719.26	193.96	139.23	14,456,745.11	1,730,116.27	39.80735562	-80.68059860
3,836.00	21.00	71.26	3,807.81	207.16	167.75	14,456,758.31	1,730,144.80	39.80739160	-80.68049686
3,931.00	23.60	77.17	3,895.71	216.86	202.43	14,456,768.01	1,730,179.47	39.80741789	-80.68037328
4,025.00	26.65	74.92	3,980.81	226.52	241.14	14,456,777.67	1,730,218.18	39.80744405	-80.68023531
4,120.00	30.57	74.31	4,064.19	238.60	284.98	14,456,789.75	1,730,262.03	39.80747680	-80.68007903
4,215.00	34.91	72.63	4,144.08	253.26	334.21	14,456,804.41	1,730,311.26	39.80751656	-80.67990356

RECEIVED
Office of Oil and Gas
JUN 10 2020
WV Department of
Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Ten High 1N-19HM (R)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Well:	Ten High 1N-19HM (R)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,310.00	37.32	72.01	4,220.82	270.27	387.55	14,456,821.42	1,730,364.60	39.80756276	-80.67971340
4,404.00	38.93	70.75	4,294.77	288.81	442.54	14,456,839.96	1,730,419.59	39.80761313	-80.67951737
4,499.00	37.54	69.38	4,369.39	308.84	497.81	14,456,860.00	1,730,474.86	39.80766760	-80.67932031
4,597.00	37.21	67.70	4,447.27	330.60	553.17	14,456,881.75	1,730,530.22	39.80772682	-80.67912290
4,691.00	36.37	69.56	4,522.55	351.12	605.59	14,456,902.27	1,730,582.63	39.80778265	-80.67893600
4,786.00	35.84	70.92	4,599.30	370.05	658.27	14,456,921.20	1,730,635.31	39.80783411	-80.67874818
4,881.00	36.97	72.74	4,675.77	387.62	711.84	14,456,938.77	1,730,688.88	39.80788183	-80.67855721
4,975.00	37.08	73.70	4,750.81	403.96	766.03	14,456,955.11	1,730,743.07	39.80792617	-80.67836404
5,070.00	37.73	72.92	4,826.28	420.53	821.30	14,456,971.69	1,730,798.35	39.80797115	-80.67816701
5,164.00	38.00	71.99	4,900.49	437.93	876.31	14,456,989.08	1,730,853.36	39.80801837	-80.67797090
5,259.00	37.18	71.54	4,975.76	456.06	931.35	14,457,007.21	1,730,908.40	39.80806762	-80.67777468
5,354.00	37.15	72.13	5,051.47	473.95	985.88	14,457,025.10	1,730,962.93	39.80811622	-80.67758029
5,449.00	35.54	73.56	5,127.99	490.57	1,039.67	14,457,041.72	1,731,016.72	39.80816132	-80.67738855
5,543.00	36.40	74.39	5,204.06	505.81	1,092.74	14,457,056.96	1,731,069.78	39.80820264	-80.67719939
5,638.00	37.04	73.82	5,280.21	521.37	1,147.37	14,457,072.52	1,731,124.41	39.80824483	-80.67700468
5,733.00	37.24	74.52	5,355.94	537.01	1,202.55	14,457,088.16	1,731,179.59	39.80828724	-80.67680799
5,827.00	38.38	73.65	5,430.21	552.82	1,257.96	14,457,103.97	1,731,235.01	39.80833010	-80.67661047
5,921.00	36.73	70.63	5,504.73	570.36	1,312.49	14,457,121.51	1,731,289.53	39.80837773	-80.67641608
6,016.00	38.34	71.20	5,580.06	589.28	1,367.18	14,457,140.43	1,731,344.23	39.80842914	-80.67622108
6,111.00	36.99	70.15	5,655.26	608.48	1,421.96	14,457,159.63	1,731,399.01	39.80848133	-80.67602578
6,205.00	36.22	74.26	5,730.73	625.62	1,475.30	14,457,176.77	1,731,452.35	39.80852787	-80.67583563
6,300.00	35.74	72.46	5,807.61	641.59	1,528.77	14,457,192.74	1,731,505.82	39.80857121	-80.67564502
6,394.00	37.14	73.04	5,883.23	658.14	1,582.09	14,457,209.30	1,731,559.14	39.80861613	-80.67545494
6,488.00	38.05	73.94	5,957.71	674.44	1,637.08	14,457,225.59	1,731,614.12	39.80866033	-80.67525895
6,582.00	38.56	73.40	6,031.48	690.82	1,692.99	14,457,241.97	1,731,670.04	39.80870476	-80.67505964
6,677.00	37.86	76.68	6,106.13	706.00	1,749.74	14,457,257.15	1,731,726.79	39.80874588	-80.67485737
6,786.00	36.22	75.59	6,193.13	721.72	1,813.48	14,457,272.87	1,731,790.53	39.80878842	-80.67463018
6,881.00	37.71	73.66	6,269.04	736.88	1,868.55	14,457,288.03	1,731,845.60	39.80882950	-80.67443389
6,975.00	39.60	64.25	6,342.51	758.00	1,923.18	14,457,309.15	1,731,900.22	39.80886697	-80.67423912
7,069.00	41.19	52.04	6,414.21	790.11	1,974.65	14,457,341.26	1,731,951.70	39.80897463	-80.67405541
7,164.00	43.16	37.09	6,484.79	835.39	2,019.03	14,457,386.54	1,731,996.07	39.80909853	-80.67389681
7,259.00	46.55	27.69	6,552.20	891.92	2,054.69	14,457,443.07	1,732,031.74	39.80925343	-80.67376907
7,353.00	48.35	17.85	6,615.85	955.65	2,081.35	14,457,506.81	1,732,058.40	39.80942818	-80.67367331
7,448.00	50.07	7.92	6,678.00	1,025.62	2,097.28	14,457,576.77	1,732,074.32	39.80962017	-80.67361571
7,542.00	53.01	0.62	6,736.50	1,098.93	2,102.65	14,457,650.09	1,732,079.70	39.80982145	-80.67359560
7,636.00	59.52	353.24	6,788.73	1,176.85	2,098.28	14,457,728.01	1,732,075.33	39.81003548	-80.67361016
7,730.00	69.36	348.23	6,829.26	1,260.38	2,084.50	14,457,811.54	1,732,061.55	39.81026501	-80.67365814
7,825.00	74.73	345.50	6,858.54	1,348.34	2,063.94	14,457,899.50	1,732,040.99	39.81050678	-80.67373021
7,919.00	81.71	342.69	6,877.72	1,436.77	2,038.72	14,457,987.92	1,732,015.76	39.81074986	-80.67381889
8,014.00	83.16	336.71	6,890.24	1,525.05	2,006.05	14,458,076.20	1,731,983.10	39.81099262	-80.67393406
8,109.00	84.70	331.35	6,900.29	1,609.94	1,964.70	14,458,161.09	1,731,941.74	39.81122617	-80.67408022
8,201.00	85.23	331.44	6,908.36	1,690.40	1,920.82	14,458,241.55	1,731,897.87	39.81144757	-80.67423542
8,296.00	89.45	331.18	6,912.77	1,773.62	1,875.27	14,458,324.78	1,731,852.32	39.81167658	-80.67439654
8,390.00	89.85	331.35	6,913.34	1,856.05	1,830.08	14,458,407.20	1,731,807.13	39.81190339	-80.67455639
8,484.00	89.10	330.21	6,914.21	1,938.08	1,784.20	14,458,489.23	1,731,761.24	39.81212913	-80.67471872
8,579.00	89.27	329.86	6,915.56	2,020.37	1,736.75	14,458,571.52	1,731,713.80	39.81235560	-80.67488661
8,674.00	89.23	329.86	6,916.80	2,102.52	1,689.06	14,458,653.67	1,731,666.10	39.81258167	-80.67505539
8,768.00	91.47	330.12	6,916.23	2,183.91	1,642.05	14,458,735.06	1,731,619.09	39.81280566	-80.67522174
8,862.00	92.09	329.77	6,913.31	2,265.23	1,594.99	14,458,816.39	1,731,572.04	39.81302946	-80.67538826
8,957.00	93.10	329.51	6,909.01	2,347.12	1,547.02	14,458,898.27	1,731,524.07	39.81325482	-80.67555801
9,052.00	93.01	328.36	6,903.94	2,428.38	1,498.07	14,458,979.53	1,731,475.12	39.81347846	-80.67573127
9,147.00	90.68	328.36	6,900.88	2,509.21	1,448.27	14,459,060.36	1,731,425.31	39.81370094	-80.67590759
9,241.00	90.42	327.84	6,899.98	2,589.01	1,398.60	14,459,140.16	1,731,375.64	39.81392058	-80.67608345
9,336.00	90.81	329.16	6,898.96	2,670.01	1,348.96	14,459,221.16	1,731,326.01	39.81414351	-80.67625915
9,430.00	90.81	327.40	6,897.63	2,749.95	1,299.55	14,459,301.11	1,731,276.59	39.81436355	-80.67643409

RECEIVED
Office of Oil and Gas
JUN 10 2020
WV Department of
Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Ten High 1N-19HM (R)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Well:	Ten High 1N-19HM (R)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,525.00	91.56	329.68	6,895.67	2,830.97	1,249.98	14,459,382.12	1,731,227.03	39.81458652	-80.67660956
9,619.00	91.34	326.52	6,893.29	2,910.73	1,200.33	14,459,461.88	1,731,177.38	39.81480608	-80.67678535
9,714.00	92.57	329.77	6,890.05	2,991.36	1,150.23	14,459,542.52	1,731,127.27	39.81502801	-80.67696273
9,809.00	92.88	330.12	6,885.53	3,073.50	1,102.70	14,459,624.65	1,731,079.75	39.81525404	-80.67713092
9,903.00	90.86	331.53	6,882.46	3,155.52	1,056.91	14,459,706.67	1,731,033.95	39.81547975	-80.67729295
9,998.00	91.12	332.06	6,880.82	3,239.23	1,012.02	14,459,790.38	1,730,989.06	39.81571007	-80.67745174
10,093.00	91.03	331.97	6,879.04	3,323.11	967.45	14,459,874.26	1,730,944.49	39.81594086	-80.67760939
10,188.00	90.90	330.83	6,877.44	3,406.50	921.98	14,459,957.65	1,730,899.02	39.81617033	-80.67777024
10,282.00	91.60	332.23	6,875.39	3,489.11	877.18	14,460,040.26	1,730,854.23	39.81639764	-80.67792871
10,377.00	91.65	332.76	6,872.69	3,573.34	833.32	14,460,124.49	1,730,810.37	39.81662939	-80.67808381
10,472.00	92.18	330.91	6,869.52	3,657.04	788.51	14,460,208.19	1,730,765.56	39.81685969	-80.67824233
10,566.00	92.09	327.31	6,866.02	3,737.64	740.29	14,460,288.79	1,730,717.34	39.81708151	-80.67841302
10,661.00	92.48	329.68	6,862.23	3,818.56	690.69	14,460,369.72	1,730,667.74	39.81730424	-80.67858862
10,755.00	92.44	328.72	6,858.19	3,899.23	642.60	14,460,450.38	1,730,619.65	39.81752624	-80.67875884
10,850.00	90.46	329.95	6,855.79	3,980.91	594.17	14,460,532.07	1,730,571.22	39.81775104	-80.67893028
10,945.00	91.21	330.56	6,854.41	4,063.39	547.04	14,460,614.54	1,730,524.09	39.81797800	-80.67909706
11,039.00	91.56	330.39	6,852.13	4,145.16	500.73	14,460,696.31	1,730,477.78	39.81820301	-80.67926094
11,134.00	92.04	329.77	6,849.15	4,227.45	453.37	14,460,778.61	1,730,430.42	39.81842949	-80.67942856
11,229.00	91.91	330.91	6,845.87	4,309.96	406.39	14,460,861.11	1,730,383.44	39.81865652	-80.67959482
11,323.00	91.08	328.63	6,843.42	4,391.14	359.08	14,460,942.29	1,730,336.13	39.81887993	-80.67976226
11,418.00	91.21	329.95	6,841.52	4,472.80	310.58	14,461,023.95	1,730,287.62	39.81910467	-80.67993397
11,513.00	91.74	331.18	6,839.08	4,555.51	263.91	14,461,106.66	1,730,240.95	39.81933226	-80.68009912
11,608.00	92.13	330.74	6,835.87	4,638.52	217.82	14,461,189.67	1,730,194.87	39.81956067	-80.68026220
11,702.00	92.48	330.39	6,832.09	4,720.32	171.66	14,461,271.47	1,730,148.71	39.81978577	-80.68042554
11,796.00	92.92	331.62	6,827.66	4,802.44	126.15	14,461,353.59	1,730,103.20	39.82001175	-80.68058659
11,891.00	91.03	331.88	6,824.39	4,886.07	81.21	14,461,437.22	1,730,058.26	39.82024186	-80.68074556
11,986.00	90.95	332.32	6,822.75	4,970.02	36.77	14,461,521.17	1,730,013.81	39.82047283	-80.68090279
12,081.00	90.59	332.23	6,821.47	5,054.10	-7.43	14,461,605.25	1,729,969.62	39.82070418	-80.68105911
12,175.00	92.31	332.06	6,819.09	5,137.18	-51.33	14,461,688.33	1,729,925.72	39.82093276	-80.68121442
12,269.00	92.53	329.42	6,815.12	5,219.11	-97.23	14,461,770.26	1,729,879.82	39.82115820	-80.68137685
12,364.00	91.47	330.47	6,811.81	5,301.28	-144.78	14,461,852.43	1,729,832.27	39.82138433	-80.68154515
12,458.00	91.47	330.47	6,809.39	5,383.04	-191.09	14,461,934.20	1,729,785.95	39.82160933	-80.68170906
12,551.00	91.25	330.30	6,807.19	5,463.87	-237.04	14,462,015.02	1,729,740.01	39.82183175	-80.68187167
12,646.00	90.55	330.21	6,805.70	5,546.34	-284.17	14,462,097.50	1,729,692.88	39.82205870	-80.68203847
12,740.00	90.59	330.65	6,804.76	5,628.10	-330.55	14,462,179.25	1,729,646.49	39.82228366	-80.68220264
12,835.00	91.47	330.74	6,803.05	5,710.93	-377.04	14,462,262.08	1,729,600.00	39.82251158	-80.68236716
12,929.00	91.65	330.39	6,800.49	5,792.76	-423.22	14,462,343.91	1,729,553.83	39.82273677	-80.68253059
13,024.00	91.65	328.98	6,797.76	5,874.73	-471.15	14,462,425.89	1,729,505.90	39.82296236	-80.68270026
13,118.00	91.25	328.45	6,795.38	5,955.04	-519.95	14,462,506.19	1,729,457.10	39.82318337	-80.68287305
13,213.00	91.21	328.01	6,793.34	6,035.79	-569.96	14,462,586.94	1,729,407.09	39.82340561	-80.68305013
13,307.00	90.73	328.63	6,791.75	6,115.77	-619.31	14,462,666.92	1,729,357.73	39.82362573	-80.68322492
13,402.00	90.81	330.30	6,790.47	6,197.58	-667.57	14,462,748.74	1,729,309.47	39.82385089	-80.68339577
13,496.00	91.30	330.83	6,788.74	6,279.44	-713.76	14,462,830.59	1,729,263.29	39.82407612	-80.68355923
13,590.00	92.35	331.00	6,785.75	6,361.54	-759.43	14,462,912.69	1,729,217.61	39.82430204	-80.68372086
13,686.00	92.62	331.35	6,781.59	6,445.56	-805.67	14,462,996.72	1,729,171.37	39.82453324	-80.68388450
13,780.00	90.95	330.91	6,778.66	6,527.84	-851.03	14,463,078.99	1,729,126.01	39.82475963	-80.68404502
13,875.00	91.25	330.39	6,776.83	6,610.63	-897.59	14,463,161.78	1,729,079.46	39.82498744	-80.68420979
13,970.00	90.95	331.44	6,775.01	6,693.63	-943.76	14,463,244.79	1,729,033.29	39.82521584	-80.68437319
14,064.00	92.48	335.57	6,772.20	6,777.70	-985.67	14,463,328.85	1,728,991.38	39.82544711	-80.68452140
14,159.00	91.56	332.58	6,768.85	6,863.08	-1,027.17	14,463,414.23	1,728,949.88	39.82568198	-80.68466815
14,254.00	90.99	329.42	6,766.73	6,946.13	-1,073.21	14,463,497.29	1,728,903.84	39.82591052	-80.68483108
14,348.00	90.51	328.54	6,765.50	7,026.68	-1,121.65	14,463,577.84	1,728,855.40	39.82613219	-80.68500259
14,443.00	90.55	328.01	6,764.62	7,107.49	-1,171.60	14,463,658.64	1,728,805.45	39.82635458	-80.68517950
14,538.00	90.81	327.66	6,763.49	7,187.90	-1,222.17	14,463,739.05	1,728,754.88	39.82657590	-80.68535861
14,632.00	91.12	330.12	6,761.91	7,268.36	-1,270.73	14,463,819.51	1,728,706.32	39.82679734	-80.68553055

RECEIVED
Office of Oil and Gas
JUN 10 2020
WV Department of
Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Ten High 1N-19HM (R)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Well:	Ten High 1N-19HM (R)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,727.00	91.34	330.12	6,759.87	7,350.71	-1,318.04	14,463,901.87	1,728,659.00	39.82702395	-80.68569805
14,822.00	91.74	329.24	6,757.32	7,432.69	-1,365.99	14,463,983.84	1,728,611.06	39.82724954	-80.68586778
14,917.00	91.91	327.57	6,754.29	7,513.56	-1,415.73	14,464,064.72	1,728,561.32	39.82747212	-80.68604394
15,011.00	91.30	330.65	6,751.66	7,594.19	-1,463.96	14,464,145.34	1,728,513.08	39.82769400	-80.68621473
15,106.00	91.82	330.65	6,749.07	7,676.96	-1,510.51	14,464,228.12	1,728,466.54	39.82792177	-80.68637949
15,201.00	92.09	330.12	6,745.83	7,759.51	-1,557.43	14,464,310.66	1,728,419.62	39.82814890	-80.68654557
15,296.00	90.81	330.30	6,743.43	7,841.92	-1,604.61	14,464,393.08	1,728,372.44	39.82837569	-80.68671260
15,391.00	91.16	330.91	6,741.80	7,924.68	-1,651.23	14,464,475.83	1,728,325.81	39.82860341	-80.68687762
15,485.00	90.86	332.41	6,740.14	8,007.40	-1,695.85	14,464,558.55	1,728,281.20	39.82883100	-80.68703550
15,580.00	90.55	331.62	6,738.97	8,091.28	-1,740.42	14,464,642.43	1,728,236.63	39.82906179	-80.68719322
15,674.00	91.12	332.06	6,737.60	8,174.15	-1,784.78	14,464,725.30	1,728,192.27	39.82928978	-80.68735018
15,769.00	92.09	332.32	6,734.94	8,258.14	-1,829.08	14,464,809.29	1,728,147.97	39.82952087	-80.68750694
15,863.00	90.77	328.45	6,732.59	8,339.82	-1,875.51	14,464,890.97	1,728,101.54	39.82974562	-80.68767130
15,958.00	91.21	327.40	6,730.95	8,420.30	-1,925.95	14,464,971.45	1,728,051.10	39.82996714	-80.68784995
16,053.00	89.54	329.33	6,730.33	8,501.18	-1,975.77	14,465,052.33	1,728,001.28	39.83018972	-80.68802641
16,148.00	89.93	329.24	6,730.77	8,582.85	-2,024.29	14,465,134.00	1,727,952.75	39.83041447	-80.68819823
16,243.00	90.33	329.59	6,730.55	8,664.63	-2,072.63	14,465,215.79	1,727,904.42	39.83063953	-80.68836939
16,337.00	90.81	329.59	6,729.62	8,745.70	-2,120.21	14,465,296.85	1,727,856.84	39.83086261	-80.68853786
16,432.00	91.12	329.77	6,728.02	8,827.69	-2,168.16	14,465,378.84	1,727,808.89	39.83108824	-80.68870765
16,526.00	91.78	329.59	6,725.64	8,908.81	-2,215.60	14,465,459.96	1,727,761.45	39.83131146	-80.68887561
16,621.00	92.22	329.77	6,722.32	8,990.76	-2,263.53	14,465,541.91	1,727,713.52	39.83153698	-80.68904532
16,716.00	92.57	329.51	6,718.35	9,072.66	-2,311.50	14,465,623.82	1,727,665.54	39.83176236	-80.68921519
16,809.00	93.23	329.77	6,713.65	9,152.81	-2,358.45	14,465,703.96	1,727,618.60	39.83198290	-80.68938142
16,904.00	89.98	330.12	6,710.99	9,234.99	-2,406.00	14,465,786.14	1,727,571.05	39.83220905	-80.68954979
16,999.00	90.68	330.39	6,710.44	9,317.47	-2,453.13	14,465,868.62	1,727,523.91	39.83243601	-80.68971666
17,093.00	91.25	330.56	6,708.86	9,399.25	-2,499.45	14,465,950.40	1,727,477.60	39.83266104	-80.68988063
17,188.00	92.53	331.18	6,705.72	9,482.19	-2,545.67	14,466,033.34	1,727,431.38	39.83288924	-80.69004424
17,283.00	92.04	330.83	6,701.94	9,565.22	-2,591.68	14,466,116.37	1,727,385.36	39.83311769	-80.69020711
17,378.00	89.63	330.12	6,700.55	9,647.86	-2,638.49	14,466,199.02	1,727,338.56	39.83334511	-80.69037283
17,472.00	89.80	329.86	6,701.02	9,729.26	-2,685.50	14,466,280.41	1,727,291.54	39.83356909	-80.69053929
17,567.00	89.98	330.30	6,701.20	9,811.60	-2,732.89	14,466,362.75	1,727,244.16	39.83379566	-80.69070707
17,662.00	89.63	330.56	6,701.53	9,894.22	-2,779.77	14,466,445.38	1,727,197.28	39.83402301	-80.69087304
17,757.00	89.93	331.53	6,701.89	9,977.35	-2,825.76	14,466,528.50	1,727,151.29	39.83425173	-80.69103584
17,851.00	90.73	331.00	6,701.35	10,059.77	-2,870.95	14,466,610.92	1,727,106.10	39.83447850	-80.69119580
17,946.00	91.56	331.00	6,699.45	10,142.84	-2,917.00	14,466,693.99	1,727,060.05	39.83470707	-80.69135881
18,041.00	92.48	331.26	6,696.10	10,225.98	-2,962.84	14,466,777.13	1,727,014.21	39.83493583	-80.69152108
18,135.00	92.35	331.62	6,692.14	10,308.47	-3,007.74	14,466,859.62	1,726,969.31	39.83516279	-80.69168000
18,230.00	91.78	331.79	6,688.72	10,392.06	-3,052.74	14,466,943.22	1,726,924.31	39.83539279	-80.69183928
18,261.00	91.82	331.62	6,687.74	10,419.35	-3,067.42	14,466,970.50	1,726,909.62	39.83546785	-80.69189126
Survey @ 18261.00 MD 6687.74 TVD									
18,318.00	91.82	331.62	6,685.93	10,469.47	-3,094.50	14,467,020.62	1,726,882.54	39.83560576	-80.69198711
Survey projected to 18318.00 MD 6685.93 TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
225.00	225.00	-0.37	-0.55	MWD surveys
18,261.00	6,687.74	10,419.35	-3,067.42	Survey @ 18261.00 MD 6687.74 TVD
18,318.00	6,685.93	10,469.47	-3,094.50	Survey projected to 18318.00 MD 6685.93 TVD

RECEIVED
Office of Oil and Gas
JUN 10 2020
WV Department of
Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Ten High 1N-19HM (R)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Site:	Ten High	MD Reference:	RKB=1310+33 @ 1343.00usft (Nabors X08)
Well:	Ten High 1N-19HM (R)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

RECEIVED
Office of Oil and Gas
JUN 10 2020
WV Department of
Environmental Protection