



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Ten High 1S-06HM (O)
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 1S-06HM (O)	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 1S-06HM (O)					
Well Position	+N/-S	0.00 usft	Northing:	14,456,511.27 usft	Latitude:	39.80671402
	+E/-W	0.00 usft	Easting:	1,730,057.68 usft	Longitude:	-80.68081021
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,310.00 usft	

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/4/2018	-8.75	66.85	52,011.06724868

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	189.27

Survey Program	Date	12/18/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
250.00	1,119.00	MWD 17 1/2 (Original Hole)	MWD	MWD - Standard	
1,186.00	17,219.00	MWD (Original Hole)	MWD	MWD - Standard	
17,274.00	17,274.00	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	14,456,511.27	1,730,057.68	39.80671402	-80.68081021	
250.00	0.13	56.61	250.00	0.16	0.24	14,456,511.43	1,730,057.91	39.80671445	-80.68080937	
MWD surveys										
280.00	0.28	86.01	280.00	0.18	0.34	14,456,511.45	1,730,058.02	39.80671451	-80.68080900	
310.00	0.27	250.79	310.00	0.16	0.34	14,456,511.43	1,730,058.02	39.80671446	-80.68080898	
343.00	0.17	233.12	343.00	0.11	0.23	14,456,511.38	1,730,057.91	39.80671431	-80.68080938	
374.00	0.36	300.53	374.00	0.13	0.11	14,456,511.40	1,730,057.79	39.80671437	-80.68080981	
404.00	0.40	148.38	404.00	0.09	0.09	14,456,511.36	1,730,057.76	39.80671426	-80.68080991	
434.00	0.44	166.00	434.00	-0.11	0.17	14,456,511.16	1,730,057.85	39.80671371	-80.68080961	
466.00	0.40	181.23	466.00	-0.34	0.20	14,456,510.93	1,730,057.87	39.80671307	-80.68080952	



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Well:	Ten High 1S-06HM (O)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
497.00	0.14	183.54	497.00	-0.49	0.19	14,456,510.78	1,730,057.87	39.80671267	-80.68080954
529.00	0.43	82.71	529.00	-0.51	0.31	14,456,510.76	1,730,057.99	39.80671261	-80.68080912
560.00	0.10	220.47	560.00	-0.52	0.41	14,456,510.75	1,730,058.08	39.80671259	-80.68080877
592.00	0.10	11.54	591.99	-0.51	0.39	14,456,510.76	1,730,058.07	39.80671261	-80.68080882
623.00	0.29	149.48	622.99	-0.56	0.44	14,456,510.72	1,730,058.12	39.80671249	-80.68080866
654.00	0.14	306.51	653.99	-0.60	0.45	14,456,510.67	1,730,058.13	39.80671237	-80.68080863
686.00	0.44	202.17	685.99	-0.69	0.37	14,456,510.58	1,730,058.05	39.80671212	-80.68080890
718.00	0.00	130.57	717.99	-0.80	0.32	14,456,510.47	1,730,058.00	39.80671181	-80.68080907
749.00	0.13	2.85	748.99	-0.77	0.33	14,456,510.50	1,730,058.00	39.80671191	-80.68080906
781.00	0.18	111.43	780.99	-0.75	0.37	14,456,510.52	1,730,058.05	39.80671195	-80.68080889
812.00	0.60	159.68	811.99	-0.92	0.48	14,456,510.35	1,730,058.15	39.80671149	-80.68080853
844.00	0.36	167.27	843.99	-1.18	0.56	14,456,510.10	1,730,058.23	39.80671078	-80.68080825
875.00	0.06	177.33	874.99	-1.29	0.58	14,456,509.98	1,730,058.26	39.80671048	-80.68080817
907.00	0.21	114.50	906.99	-1.33	0.63	14,456,509.94	1,730,058.31	39.80671037	-80.68080798
938.00	0.14	105.49	937.99	-1.36	0.72	14,456,509.91	1,730,058.40	39.80671027	-80.68080766
969.00	0.33	149.40	968.99	-1.45	0.80	14,456,509.82	1,730,058.48	39.80671003	-80.68080737
1,001.00	0.27	259.94	1,000.99	-1.54	0.78	14,456,509.73	1,730,058.45	39.80670978	-80.68080747
1,033.00	0.35	227.31	1,032.99	-1.62	0.63	14,456,509.65	1,730,058.31	39.80670956	-80.68080799
1,064.00	0.21	295.35	1,063.99	-1.66	0.51	14,456,509.61	1,730,058.19	39.80670945	-80.68080842
1,096.00	0.13	134.35	1,095.99	-1.66	0.48	14,456,509.61	1,730,058.16	39.80670945	-80.68080852
1,119.00	0.32	230.02	1,118.99	-1.72	0.45	14,456,509.55	1,730,058.13	39.80670929	-80.68080863
1,186.00	0.19	264.29	1,185.99	-1.85	0.20	14,456,509.42	1,730,057.87	39.80670893	-80.68080953
1,281.00	0.38	262.16	1,280.99	-1.91	-0.27	14,456,509.36	1,730,057.41	39.80670878	-80.68081120
1,375.00	0.43	242.34	1,374.99	-2.12	-0.89	14,456,509.15	1,730,056.78	39.80670822	-80.68081342
1,470.00	0.73	271.90	1,469.98	-2.26	-1.81	14,456,509.01	1,730,055.86	39.80670782	-80.68081670
1,565.00	0.87	253.34	1,564.97	-2.45	-3.11	14,456,508.82	1,730,054.57	39.80670732	-80.68082131
1,660.00	0.79	264.02	1,659.96	-2.72	-4.45	14,456,508.55	1,730,053.23	39.80670658	-80.68082610
1,754.00	0.61	256.67	1,753.96	-2.91	-5.58	14,456,508.36	1,730,052.09	39.80670609	-80.68083013
1,849.00	1.09	281.90	1,848.95	-2.84	-6.96	14,456,508.43	1,730,050.72	39.80670630	-80.68083503
1,944.00	2.33	289.57	1,943.90	-2.00	-9.66	14,456,509.27	1,730,048.01	39.80670861	-80.68084465
2,038.00	3.96	289.78	2,037.76	-0.27	-14.52	14,456,511.01	1,730,043.16	39.80671343	-80.68086191
2,133.00	4.72	288.25	2,132.48	2.07	-21.32	14,456,513.34	1,730,036.36	39.80671991	-80.68088609
2,228.00	5.09	286.67	2,227.14	4.50	-29.07	14,456,515.77	1,730,028.61	39.80672667	-80.68091365
2,322.00	4.59	279.75	2,320.80	6.33	-36.77	14,456,517.61	1,730,020.91	39.80673178	-80.68094105
2,417.00	4.46	277.04	2,415.51	7.43	-44.18	14,456,518.70	1,730,013.50	39.80673486	-80.68096743
2,512.00	4.42	274.96	2,510.22	8.20	-51.49	14,456,519.47	1,730,006.18	39.80673704	-80.68099346
2,606.00	4.05	274.26	2,603.96	8.76	-58.41	14,456,520.03	1,729,999.27	39.80673865	-80.68101809
2,701.00	4.49	272.09	2,698.70	9.14	-65.47	14,456,520.42	1,729,992.20	39.80673978	-80.68104323
2,789.00	4.48	271.56	2,786.43	9.36	-72.35	14,456,520.64	1,729,985.33	39.80674044	-80.68106771
2,883.00	5.00	269.08	2,880.11	9.40	-80.12	14,456,520.67	1,729,977.56	39.80674061	-80.68109537
2,978.00	4.62	267.10	2,974.77	9.14	-88.08	14,456,520.41	1,729,969.60	39.80673998	-80.68112371
3,073.00	4.50	265.97	3,069.47	8.68	-95.62	14,456,519.95	1,729,962.06	39.80673880	-80.68115056
3,167.00	5.62	273.57	3,163.11	8.71	-103.89	14,456,519.98	1,729,953.79	39.80673896	-80.68118002
3,262.00	7.02	277.99	3,257.53	9.81	-114.28	14,456,521.08	1,729,943.40	39.80674207	-80.68121701
3,357.00	8.98	280.06	3,351.60	11.91	-127.33	14,456,523.18	1,729,930.35	39.80674797	-80.68126345
3,451.00	8.75	277.50	3,444.48	14.12	-141.64	14,456,525.40	1,729,916.03	39.80675419	-80.68131438
3,546.00	7.75	275.61	3,538.49	15.69	-155.18	14,456,526.96	1,729,902.49	39.80675864	-80.68136257
3,641.00	8.79	274.92	3,632.50	16.94	-168.79	14,456,528.21	1,729,888.89	39.80676220	-80.68141101
3,736.00	10.47	276.22	3,726.16	18.50	-184.60	14,456,529.77	1,729,873.07	39.80676663	-80.68146730
3,831.00	10.16	274.18	3,819.63	20.05	-201.54	14,456,531.32	1,729,856.14	39.80677104	-80.68152759
3,926.00	10.51	274.46	3,913.08	21.33	-218.54	14,456,532.60	1,729,839.14	39.80677474	-80.68158808
4,023.00	9.55	271.78	4,008.60	22.27	-235.40	14,456,533.54	1,729,822.28	39.80677748	-80.68164812
4,118.00	10.32	274.60	4,102.18	23.19	-251.76	14,456,534.47	1,729,805.92	39.80678018	-80.68170636
4,213.00	11.51	279.06	4,195.46	25.37	-269.60	14,456,536.64	1,729,788.08	39.80678633	-80.68176986
4,307.00	10.55	278.11	4,287.72	28.06	-287.38	14,456,539.33	1,729,770.30	39.80679389	-80.68183314



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Survey									
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4,402.00	12.10	280.19	4,380.87	31.05	-305.79	14,456,542.32	1,729,751.88	39.80680228	-80.68189866
4,497.00	12.25	276.68	4,473.73	33.98	-325.60	14,456,545.26	1,729,732.07	39.80681053	-80.68196916
4,591.00	11.25	271.59	4,565.76	35.40	-344.68	14,456,546.67	1,729,713.00	39.80681460	-80.68203705
4,686.00	10.42	267.38	4,659.07	35.26	-362.52	14,456,546.53	1,729,695.16	39.80681440	-80.68210059
4,780.00	10.52	261.45	4,751.51	33.60	-379.50	14,456,544.87	1,729,678.18	39.80681000	-80.68216107
4,875.00	10.47	268.26	4,844.92	32.05	-396.70	14,456,543.32	1,729,660.97	39.80680591	-80.68222235
4,970.00	9.89	277.67	4,938.43	32.87	-413.42	14,456,544.15	1,729,644.26	39.80680834	-80.68228185
5,065.00	9.80	276.51	5,032.03	34.88	-429.54	14,456,546.15	1,729,628.14	39.80681400	-80.68233922
5,159.00	9.44	271.96	5,124.71	36.05	-445.19	14,456,547.32	1,729,612.49	39.80681737	-80.68239494
5,254.00	9.69	266.71	5,218.40	35.86	-460.96	14,456,547.13	1,729,596.72	39.80681700	-80.68245109
5,348.00	9.96	275.65	5,311.02	36.20	-476.95	14,456,547.48	1,729,580.73	39.80681810	-80.68250802
5,443.00	10.26	273.07	5,404.55	37.47	-493.57	14,456,548.74	1,729,564.11	39.80682173	-80.68256719
5,538.00	9.34	273.55	5,498.16	38.40	-509.71	14,456,549.67	1,729,547.96	39.80682444	-80.68262466
5,633.00	9.47	282.30	5,591.89	40.54	-525.04	14,456,551.81	1,729,532.63	39.80683048	-80.68267922
5,727.00	9.39	278.14	5,684.62	43.27	-540.19	14,456,554.54	1,729,517.49	39.80683813	-80.68273312
5,822.00	10.36	282.95	5,778.21	46.28	-556.19	14,456,557.55	1,729,501.49	39.80684656	-80.68279005
5,917.00	11.56	283.38	5,871.48	50.40	-573.77	14,456,561.67	1,729,483.90	39.80685803	-80.68285261
5,977.00	12.79	281.19	5,930.13	53.08	-586.14	14,456,564.35	1,729,471.54	39.80686552	-80.68289660
6,032.00	13.41	279.68	5,983.70	55.33	-598.40	14,456,566.61	1,729,459.28	39.80687182	-80.68294023
6,126.00	7.08	244.26	6,076.23	54.65	-614.39	14,456,565.92	1,729,443.29	39.80687010	-80.68299718
6,221.00	6.55	200.32	6,170.62	47.02	-621.55	14,456,558.29	1,729,436.13	39.80684922	-80.68302277
6,316.00	7.91	159.89	6,264.92	35.79	-621.18	14,456,547.07	1,729,436.49	39.80681838	-80.68302161
6,409.00	12.18	153.56	6,356.48	20.99	-614.61	14,456,532.27	1,729,443.07	39.80677767	-80.68299840
6,504.00	19.03	149.87	6,447.93	-1.40	-602.36	14,456,509.87	1,729,455.32	39.80671605	-80.68295506
6,598.00	26.77	148.81	6,534.45	-32.81	-583.68	14,456,478.46	1,729,474.00	39.80662960	-80.68288892
6,693.00	36.70	148.37	6,615.15	-75.39	-557.64	14,456,435.88	1,729,500.03	39.80651242	-80.68279677
6,788.00	46.51	150.75	6,686.10	-129.77	-525.84	14,456,381.50	1,729,531.84	39.80636278	-80.68268421
6,882.00	54.51	152.07	6,745.83	-193.43	-491.20	14,456,317.84	1,729,566.48	39.80618760	-80.68256166
6,929.00	57.58	152.42	6,772.08	-227.93	-473.05	14,456,283.34	1,729,584.63	39.80609269	-80.68249746
6,976.00	58.81	152.51	6,796.85	-263.35	-454.58	14,456,247.92	1,729,603.10	39.80599524	-80.68243217
7,023.00	63.34	151.89	6,819.58	-299.73	-435.40	14,456,211.55	1,729,622.28	39.80589516	-80.68236431
7,071.00	67.60	151.10	6,839.50	-338.09	-414.56	14,456,173.18	1,729,643.12	39.80578960	-80.68229060
7,118.00	70.68	151.27	6,856.23	-376.56	-393.39	14,456,134.71	1,729,664.29	39.80568373	-80.68221572
7,165.00	73.85	151.71	6,870.55	-415.90	-372.03	14,456,095.37	1,729,685.65	39.80557550	-80.68214015
7,259.00	79.34	152.07	6,892.33	-496.52	-328.96	14,456,014.75	1,729,728.71	39.80535367	-80.68198784
7,354.00	80.92	152.94	6,908.62	-579.54	-285.76	14,455,931.73	1,729,771.92	39.80512525	-80.68183505
7,449.00	86.20	151.63	6,919.27	-663.08	-241.87	14,455,848.19	1,729,815.81	39.80489541	-80.68167982
7,543.00	88.57	148.64	6,923.56	-744.49	-195.11	14,455,766.78	1,729,862.56	39.80467137	-80.68151439
7,638.00	89.54	148.46	6,925.13	-825.53	-145.55	14,455,685.75	1,729,912.12	39.80444835	-80.68133895
7,732.00	90.33	148.90	6,925.23	-905.83	-96.69	14,455,605.44	1,729,960.99	39.80422735	-80.68116599
7,826.00	90.77	149.08	6,924.33	-986.39	-48.27	14,455,524.88	1,730,009.41	39.80400563	-80.68099459
7,920.00	91.43	148.99	6,922.53	-1,066.98	0.09	14,455,444.30	1,730,057.77	39.80378384	-80.68082345
8,015.00	90.77	148.81	6,920.70	-1,148.31	49.15	14,455,362.97	1,730,106.83	39.80356001	-80.68064979
8,109.00	90.33	150.57	6,919.80	-1,229.45	96.59	14,455,281.82	1,730,154.26	39.80333671	-80.68048193
8,204.00	90.37	151.36	6,919.22	-1,312.51	142.69	14,455,198.76	1,730,200.37	39.80310816	-80.68031882
8,299.00	91.03	151.80	6,918.06	-1,396.05	187.90	14,455,115.22	1,730,245.58	39.80287828	-80.68015891
8,391.00	89.27	151.27	6,917.82	-1,476.93	231.75	14,455,034.35	1,730,289.43	39.80265575	-80.68000383
8,486.00	89.54	152.24	6,918.80	-1,560.61	276.70	14,454,950.66	1,730,334.38	39.80242549	-80.67984483
8,580.00	88.79	150.57	6,920.17	-1,643.13	321.69	14,454,868.14	1,730,379.36	39.80219843	-80.67968572
8,674.00	88.44	149.43	6,922.45	-1,724.51	368.67	14,454,786.76	1,730,426.35	39.80197447	-80.67951947
8,769.00	88.40	149.52	6,925.07	-1,806.32	416.91	14,454,704.96	1,730,474.58	39.80174935	-80.67934878
8,864.00	88.31	149.34	6,927.79	-1,888.08	465.20	14,454,623.19	1,730,522.88	39.80152433	-80.67917786
8,958.00	90.33	148.20	6,928.91	-1,968.45	513.93	14,454,542.83	1,730,571.61	39.80130314	-80.67900539
9,053.00	91.16	148.11	6,927.67	-2,049.14	564.05	14,454,462.13	1,730,621.73	39.80108105	-80.67882797
9,147.00	91.91	148.99	6,925.15	-2,129.30	613.08	14,454,381.97	1,730,670.76	39.80086042	-80.67865444

JUN 10 2020

WV Department of Environmental Protection



Survey Report - Geographic



Company: Tug Hill Operating LLC	Local Co-ordinate Reference: Well Ten High 1S-06HM (O)	RECEIVED Office of Oil and Gas
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 1S-06HM (O)	North Reference: Grid	
Wellbore: Original Hole	Survey Calculation Method: Minimum Curvature	
Design: Surveys Original Hole	Database: DB_Jul2216dt_v14	

JUN 10 2020									
WV Department of Environmental Protection									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,242.00	91.52	148.46	6,922.31	-2,210.46	662.37	14,454,300.81	1,730,720.05	39.80063706	-80.67847997
9,337.00	90.86	148.11	6,920.34	-2,291.25	712.30	14,454,220.02	1,730,769.98	39.80041468	-80.67830323
9,431.00	90.24	144.77	6,919.44	-2,369.57	764.26	14,454,141.70	1,730,821.94	39.80019909	-80.67811926
9,526.00	90.59	148.29	6,918.75	-2,448.80	816.64	14,454,062.47	1,730,874.32	39.79998098	-80.67793377
9,620.00	91.03	148.37	6,917.42	-2,528.79	865.99	14,453,982.48	1,730,923.67	39.79976081	-80.67775910
9,715.00	90.73	149.25	6,915.96	-2,610.05	915.18	14,453,901.22	1,730,972.86	39.79953717	-80.67758500
9,809.00	89.76	151.45	6,915.56	-2,691.74	961.68	14,453,819.53	1,731,019.36	39.79931239	-80.67742050
9,904.00	90.42	152.59	6,915.41	-2,775.63	1,006.25	14,453,735.64	1,731,063.93	39.79908155	-80.67726290
9,999.00	89.54	153.38	6,915.44	-2,860.26	1,049.40	14,453,651.01	1,731,107.08	39.79884870	-80.67711035
10,094.00	88.40	151.89	6,917.15	-2,944.62	1,093.06	14,453,566.66	1,731,150.73	39.79861662	-80.67695600
10,188.00	89.05	151.54	6,919.24	-3,027.37	1,137.59	14,453,483.90	1,731,195.27	39.79838891	-80.67679852
10,283.00	89.36	151.98	6,920.56	-3,111.06	1,182.53	14,453,400.22	1,731,240.21	39.79815865	-80.67663958
10,378.00	88.70	152.24	6,922.17	-3,195.01	1,226.97	14,453,316.26	1,731,284.64	39.79792765	-80.67648247
10,472.00	88.22	151.10	6,924.69	-3,277.72	1,271.56	14,453,233.55	1,731,329.23	39.79770007	-80.67632478
10,567.00	88.92	148.99	6,927.06	-3,360.00	1,318.97	14,453,151.27	1,731,376.65	39.79747364	-80.67615702
10,662.00	89.54	149.69	6,928.34	-3,441.71	1,367.41	14,453,069.56	1,731,425.09	39.79724876	-80.67598562
10,756.00	89.98	148.81	6,928.74	-3,522.49	1,415.48	14,452,988.78	1,731,473.15	39.79702643	-80.67581555
10,851.00	91.43	148.02	6,927.57	-3,603.41	1,465.23	14,452,907.86	1,731,522.90	39.79680371	-80.67563947
10,946.00	92.53	148.64	6,924.28	-3,684.21	1,515.07	14,452,827.06	1,731,572.75	39.79658131	-80.67546305
11,040.00	90.81	148.11	6,921.54	-3,764.22	1,564.34	14,452,747.06	1,731,622.02	39.79636111	-80.67528868
11,135.00	91.21	146.88	6,919.87	-3,844.32	1,615.38	14,452,666.95	1,731,673.06	39.79614062	-80.67510800
11,229.00	90.07	149.25	6,918.82	-3,924.08	1,665.10	14,452,587.19	1,731,722.77	39.79592108	-80.67493204
11,324.00	90.33	149.34	6,918.49	-4,005.76	1,713.60	14,452,505.51	1,731,771.28	39.79569628	-80.67476040
11,419.00	90.86	149.78	6,917.50	-4,087.66	1,761.73	14,452,423.61	1,731,819.41	39.79547088	-80.67459012
11,513.00	89.49	150.31	6,917.21	-4,169.10	1,808.67	14,452,342.17	1,731,866.34	39.79524676	-80.67442408
11,608.00	89.89	150.40	6,917.73	-4,251.67	1,855.66	14,452,259.61	1,731,913.33	39.79501955	-80.67425787
11,703.00	90.24	151.19	6,917.62	-4,334.59	1,902.01	14,452,176.68	1,731,959.69	39.79479136	-80.67409392
11,798.00	90.51	151.89	6,917.00	-4,418.11	1,947.28	14,452,093.17	1,732,004.96	39.79456155	-80.67393384
11,892.00	90.11	150.22	6,916.49	-4,500.36	1,992.77	14,452,010.91	1,732,050.45	39.79433520	-80.67377295
11,986.00	90.55	150.92	6,915.95	-4,582.23	2,038.96	14,451,929.04	1,732,096.63	39.79410991	-80.67360959
12,081.00	89.32	150.75	6,916.06	-4,665.18	2,085.25	14,451,846.09	1,732,142.93	39.79388163	-80.67344585
12,176.00	89.93	151.27	6,916.68	-4,748.28	2,131.29	14,451,763.00	1,732,188.97	39.79365298	-80.67328303
12,271.00	89.14	148.29	6,917.45	-4,830.35	2,179.10	14,451,680.92	1,732,236.78	39.79342709	-80.67311389
12,365.00	89.41	148.55	6,918.64	-4,910.43	2,228.32	14,451,600.85	1,732,286.00	39.79320670	-80.67293970
12,459.00	90.02	148.11	6,919.11	-4,990.43	2,277.68	14,451,520.85	1,732,335.35	39.79298650	-80.67276505
12,554.00	90.29	146.79	6,918.85	-5,070.50	2,328.79	14,451,440.77	1,732,386.46	39.79276608	-80.67258414
12,648.00	90.99	148.20	6,917.80	-5,149.77	2,379.30	14,451,361.50	1,732,436.97	39.79254789	-80.67240536
12,742.00	91.25	148.81	6,915.96	-5,229.91	2,428.39	14,451,281.37	1,732,486.07	39.79232732	-80.67223162
12,836.00	90.24	149.34	6,914.74	-5,310.53	2,476.70	14,451,200.74	1,732,534.37	39.79210541	-80.67206071
12,930.00	90.77	150.04	6,913.91	-5,391.68	2,524.13	14,451,119.59	1,732,581.81	39.79188208	-80.67189289
13,025.00	88.92	148.55	6,914.17	-5,473.36	2,572.64	14,451,037.91	1,732,630.32	39.79165729	-80.67172128
13,119.00	89.36	148.64	6,915.58	-5,553.58	2,621.62	14,450,957.69	1,732,679.29	39.79143649	-80.67154798
13,214.00	90.29	149.17	6,915.87	-5,634.93	2,670.68	14,450,876.35	1,732,728.36	39.79121260	-80.67137439
13,308.00	89.32	150.22	6,916.19	-5,716.08	2,718.11	14,450,795.19	1,732,775.79	39.79098925	-80.67120660
13,403.00	90.42	150.84	6,916.41	-5,798.78	2,764.85	14,450,712.49	1,732,822.52	39.79076165	-80.67104130
13,497.00	89.32	151.71	6,916.62	-5,881.21	2,810.02	14,450,630.06	1,732,867.70	39.79053482	-80.67088156
13,592.00	90.29	152.33	6,916.94	-5,965.11	2,854.59	14,450,546.16	1,732,912.27	39.79030398	-80.67072400
13,686.00	88.84	152.15	6,917.66	-6,048.28	2,898.37	14,450,462.99	1,732,956.05	39.79007511	-80.67056924
13,780.00	89.71	152.24	6,918.85	-6,131.42	2,942.21	14,450,379.85	1,732,999.89	39.78984635	-80.67041425
13,875.00	88.92	151.36	6,919.98	-6,215.14	2,987.10	14,450,296.13	1,733,044.78	39.78961599	-80.67025555
13,970.00	89.41	151.45	6,921.37	-6,298.54	3,032.57	14,450,212.73	1,733,090.24	39.78938648	-80.67009481
14,065.00	88.97	150.13	6,922.71	-6,381.45	3,078.92	14,450,129.82	1,733,136.60	39.78915832	-80.66993088
14,159.00	89.49	150.13	6,923.97	-6,462.96	3,125.73	14,450,048.31	1,733,183.41	39.78893402	-80.66976531
14,254.00	90.29	150.13	6,924.15	-6,545.34	3,173.04	14,449,965.93	1,733,230.72	39.78870730	-80.66959797
14,349.00	90.11	149.60	6,923.82	-6,627.50	3,220.74	14,449,883.78	1,733,278.42	39.78848119	-80.66942927



Survey Report - Geographic



Company: Tug Hill Operating LLC	Local Co-ordinate Reference: Well Ten High 1S-06HM (O)
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 1S-06HM (O)	North Reference: Grid
Wellbore: Original Hole	Survey Calculation Method: Minimum Curvature
Design: Surveys Original Hole	Database: DB_Jul2216dt_v14

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Office of Oil and Gas
JUN 10 2020

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,444.00	91.34	150.04	6,922.62	-6,709.61	3,268.49	14,449,801.66	1,733,326.17	39.78825520	-80.66926036
14,538.00	89.80	149.52	6,921.69	-6,790.83	3,315.80	14,449,720.44	1,733,373.48	39.78803167	-80.66909303
14,633.00	87.65	149.43	6,923.80	-6,872.64	3,364.04	14,449,638.63	1,733,421.71	39.78780651	-80.66892239
14,727.00	88.00	149.69	6,927.37	-6,953.62	3,411.63	14,449,557.65	1,733,469.30	39.78758363	-80.66875405
14,822.00	88.97	150.22	6,929.88	-7,035.83	3,459.17	14,449,475.44	1,733,516.85	39.78735739	-80.66858588
14,917.00	88.04	149.60	6,932.36	-7,118.00	3,506.79	14,449,393.28	1,733,564.46	39.78713125	-80.66841748
15,011.00	88.62	149.78	6,935.10	-7,199.11	3,554.20	14,449,312.16	1,733,611.88	39.78690800	-80.66824975
15,106.00	89.19	149.87	6,936.91	-7,281.22	3,601.95	14,449,230.05	1,733,659.62	39.78668202	-80.66808089
15,201.00	87.74	149.52	6,939.46	-7,363.21	3,649.87	14,449,148.06	1,733,707.54	39.78645637	-80.66791140
15,296.00	87.96	149.34	6,943.02	-7,444.95	3,698.15	14,449,066.32	1,733,755.83	39.78623141	-80.66774061
15,391.00	88.44	149.43	6,946.00	-7,526.67	3,746.50	14,448,984.61	1,733,804.18	39.78600650	-80.66756956
15,486.00	88.70	149.34	6,948.37	-7,608.40	3,794.87	14,448,902.87	1,733,852.55	39.78578155	-80.66739848
15,580.00	90.11	149.08	6,949.35	-7,689.14	3,842.98	14,448,822.13	1,733,900.66	39.78555932	-80.66722828
15,675.00	90.73	149.34	6,948.65	-7,770.75	3,891.61	14,448,740.52	1,733,949.29	39.78533471	-80.66705626
15,769.00	90.99	148.73	6,947.24	-7,851.34	3,939.97	14,448,659.93	1,733,997.65	39.78511288	-80.66688519
15,864.00	90.64	148.64	6,945.89	-7,932.50	3,989.34	14,448,578.78	1,734,047.02	39.78488951	-80.66671053
15,958.00	89.63	148.73	6,945.67	-8,012.80	4,038.20	14,448,498.47	1,734,095.87	39.78466847	-80.66653769
16,053.00	87.82	148.37	6,947.78	-8,093.82	4,087.75	14,448,417.45	1,734,145.43	39.78444546	-80.66636238
16,148.00	88.66	148.81	6,950.70	-8,174.86	4,137.23	14,448,336.41	1,734,194.91	39.78422240	-80.66618731
16,243.00	87.91	149.17	6,953.55	-8,256.25	4,186.15	14,448,255.03	1,734,243.83	39.78399840	-80.66601425
16,338.00	88.57	149.34	6,956.46	-8,337.85	4,234.70	14,448,173.42	1,734,292.37	39.78377378	-80.66584255
16,432.00	89.54	148.64	6,958.01	-8,418.41	4,283.12	14,448,092.86	1,734,340.79	39.78355207	-80.66567127
16,526.00	88.13	149.96	6,959.92	-8,499.21	4,331.10	14,448,012.06	1,734,388.77	39.78332966	-80.66550156
16,621.00	88.66	150.31	6,962.59	-8,581.56	4,378.38	14,447,929.71	1,734,436.06	39.78310302	-80.66533434
16,716.00	89.32	150.04	6,964.26	-8,663.97	4,425.62	14,447,847.30	1,734,483.30	39.78287624	-80.66516728
16,810.00	88.00	150.57	6,966.46	-8,745.60	4,472.18	14,447,765.67	1,734,529.85	39.78265158	-80.66500267
16,904.00	88.53	150.75	6,969.30	-8,827.50	4,518.21	14,447,683.77	1,734,575.89	39.78242618	-80.66483989
16,999.00	89.19	150.84	6,971.19	-8,910.41	4,564.56	14,447,600.86	1,734,622.24	39.78219802	-80.66467603
17,094.00	90.11	151.63	6,971.77	-8,993.68	4,610.27	14,447,517.59	1,734,667.95	39.78196885	-80.66451443
17,188.00	90.77	151.63	6,971.05	-9,076.39	4,654.94	14,447,434.88	1,734,712.61	39.78174126	-80.66435655
17,219.00	90.95	151.36	6,970.59	-9,103.63	4,669.73	14,447,407.64	1,734,727.41	39.78166630	-80.66430426
Survey @ 17219.00 MD 6970.59 TVD									
17,274.00	90.95	151.36	6,969.68	-9,151.89	4,696.09	14,447,359.38	1,734,753.77	39.78153349	-80.66421109
Survey projected to 17274.00 MD 6969.68 TVD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
250.00	250.00	0.16	0.24	MWD surveys
17,219.00	6,970.59	-9,103.63	4,669.73	Survey @ 17219.00 MD 6970.59 TVD
17,274.00	6,969.68	-9,151.89	4,696.09	Survey projected to 17274.00 MD 6969.68 TVD