TUG HILL OPERATING

Survey Report - Geographic

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-08 HU (slot H)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Site:	Heaven Hill 2	MD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Well:	Heaven Hill 2-08 HU (slot H)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Jul2216dt_v14

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

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 Heaven Hill 2

Site Position:		Northing:	14,457,660.30 usft	Latitude:	39.80995400
From:	Lat/Long	Easting:	1,720,974.97 usft	Longitude:	-80.71313800
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.18 °

Well Heaven Hill 2-08 HU (slot H)

Well Position	+N/-S	0.00 usft	Northing:	14,457,661.70 usft	Latitude:	39.80995750
	+E/-W	0.00 usft	Easting:	1,721,012.96 usft	Longitude:	-80.71300270
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,331.00 usft

Wellbore Sidetrack 02

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2/20/2018	-8.71	66.92	52,106.82866823

Design Surveys Sidetrack 02

Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	10,463.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	159.22

Survey Program Date 3/5/2018

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
60.00	739.00	Gyro (Original Hole Pilot)	NS-GYRO-MS	North sensing gyrocompassing m/s
775.00	2,864.00	MWD TIP=867 MD (Original Hole Pilot)	MWD	MWD - Standard
2,953.00	10,463.00	MWD TIP=2864 MD (Original Hole Pilot)	MWD	MWD - Standard
10,560.00	18,953.00	MWD ST2 (Sidetrack 02)	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	14,457,661.70	1,721,012.96	39.80995750	-80.71300270
60.00	0.36	359.68	60.00	0.19	0.00	14,457,661.89	1,721,012.96	39.80995802	-80.71300270
90.00	0.32	344.70	90.00	0.36	-0.02	14,457,662.06	1,721,012.94	39.80995850	-80.71300278
120.00	0.36	359.40	120.00	0.54	-0.05	14,457,662.24	1,721,012.91	39.80995898	-80.71300286
150.00	0.42	347.97	150.00	0.74	-0.07	14,457,662.44	1,721,012.89	39.80995954	-80.71300294
180.00	0.58	346.49	180.00	1.00	-0.13	14,457,662.69	1,721,012.83	39.80996024	-80.71300315
210.00	0.38	353.08	210.00	1.24	-0.18	14,457,662.94	1,721,012.79	39.80996091	-80.71300331
240.00	0.42	358.35	239.99	1.45	-0.19	14,457,663.15	1,721,012.77	39.80996149	-80.71300337
270.00	0.19	0.06	269.99	1.61	-0.19	14,457,663.31	1,721,012.77	39.80996193	-80.71300338

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-08 HU (slot H)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Site:	Heaven Hill 2	MD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Well:	Heaven Hill 2-08 HU (slot H)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Jul2216dt_v14

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

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
300.00	0.25	48.96	299.99	1.70	-0.15	14,457,663.40	1,721,012.82	39.80996218	-80.71300320
330.00	0.24	36.32	329.99	1.80	-0.06	14,457,663.50	1,721,012.90	39.80996244	-80.71300289
360.00	0.35	55.98	359.99	1.90	0.05	14,457,663.60	1,721,013.02	39.80996272	-80.71300249
390.00	0.34	25.52	389.99	2.03	0.17	14,457,663.73	1,721,013.13	39.80996308	-80.71300208
420.00	0.37	44.22	419.99	2.18	0.27	14,457,663.88	1,721,013.24	39.80996349	-80.71300170
450.00	0.28	32.06	449.99	2.31	0.38	14,457,664.01	1,721,013.34	39.80996385	-80.71300132
480.00	0.41	32.47	479.99	2.46	0.48	14,457,664.16	1,721,013.44	39.80996426	-80.71300097
510.00	0.44	33.13	509.99	2.65	0.60	14,457,664.35	1,721,013.56	39.80996478	-80.71300054
540.00	0.52	43.51	539.99	2.85	0.75	14,457,664.55	1,721,013.72	39.80996531	-80.71299998
570.00	0.63	30.17	569.99	3.09	0.93	14,457,664.79	1,721,013.89	39.80996597	-80.71299935
600.00	0.63	28.78	599.99	3.37	1.09	14,457,665.07	1,721,014.06	39.80996676	-80.71299877
630.00	0.45	12.31	629.98	3.63	1.20	14,457,665.33	1,721,014.16	39.80996747	-80.71299839
660.00	0.35	50.59	659.98	3.81	1.29	14,457,665.51	1,721,014.26	39.80996795	-80.71299805
690.00	0.57	50.66	689.98	3.96	1.48	14,457,665.66	1,721,014.44	39.80996837	-80.71299738
720.00	0.62	37.51	719.98	4.18	1.69	14,457,665.88	1,721,014.66	39.80996898	-80.71299662
867.00	1.13	68.02	866.96	5.36	3.52	14,457,667.06	1,721,016.48	39.80997218	-80.71299009
898.00	1.10	62.38	897.96	5.61	4.07	14,457,667.31	1,721,017.03	39.80997287	-80.71298814
928.00	1.28	61.28	927.95	5.90	4.62	14,457,667.60	1,721,017.58	39.80997368	-80.71298618
958.00	1.50	57.80	957.94	6.27	5.25	14,457,667.97	1,721,018.21	39.80997469	-80.71298395
989.00	1.02	17.39	988.94	6.75	5.67	14,457,668.45	1,721,018.63	39.80997600	-80.71298243
1,019.00	1.90	99.22	1,018.93	6.93	6.24	14,457,668.63	1,721,019.20	39.80997648	-80.71298039
1,050.00	1.81	71.02	1,049.91	7.01	7.21	14,457,668.70	1,721,020.17	39.80997668	-80.71297694
1,080.00	1.90	64.10	1,079.90	7.38	8.11	14,457,669.08	1,721,021.07	39.80997769	-80.71297375
1,112.00	1.81	57.49	1,111.88	7.88	9.01	14,457,669.58	1,721,021.97	39.80997906	-80.71297052
1,143.00	1.59	81.11	1,142.87	8.21	9.85	14,457,669.91	1,721,022.81	39.80997996	-80.71296754
1,187.00	1.10	89.88	1,186.86	8.31	10.87	14,457,670.00	1,721,023.84	39.80998021	-80.71296388
1,282.00	1.19	166.51	1,281.84	7.35	12.02	14,457,669.05	1,721,024.98	39.80997758	-80.71295983
1,376.00	2.12	167.08	1,375.80	4.70	12.63	14,457,666.40	1,721,025.59	39.80997031	-80.71295766
1,471.00	2.39	182.99	1,470.73	1.01	12.92	14,457,662.71	1,721,025.88	39.80996017	-80.71295667
1,565.00	3.09	190.62	1,564.62	-3.43	12.35	14,457,658.26	1,721,025.31	39.80994796	-80.71295875
1,659.00	3.31	182.42	1,658.47	-8.64	11.77	14,457,653.06	1,721,024.73	39.80993368	-80.71296088
1,754.00	4.11	192.69	1,753.28	-14.70	10.91	14,457,647.00	1,721,023.87	39.80991704	-80.71296403
1,849.00	4.51	193.61	1,848.01	-21.65	9.28	14,457,640.05	1,721,022.24	39.80989797	-80.71296990
1,943.00	4.68	195.60	1,941.70	-28.93	7.38	14,457,632.76	1,721,020.34	39.80987798	-80.71297675
2,038.00	4.82	192.51	2,036.38	-36.56	5.47	14,457,625.14	1,721,018.44	39.80985704	-80.71298363
2,133.00	3.58	196.30	2,131.12	-43.31	3.78	14,457,618.39	1,721,016.74	39.80983854	-80.71298975
2,227.00	2.70	204.98	2,224.98	-48.13	2.02	14,457,613.57	1,721,014.98	39.80982531	-80.71299607
2,322.00	2.12	204.59	2,319.90	-51.76	0.34	14,457,609.94	1,721,013.30	39.80981536	-80.71300208
2,417.00	1.41	205.20	2,414.85	-54.41	-0.89	14,457,607.29	1,721,012.07	39.80980808	-80.71300648
2,511.00	1.41	210.58	2,508.82	-56.45	-1.97	14,457,605.24	1,721,010.99	39.80980248	-80.71301035
2,606.00	1.50	198.99	2,603.79	-58.64	-2.97	14,457,603.06	1,721,009.99	39.80979650	-80.71301394
2,701.00	1.68	176.38	2,698.76	-61.20	-3.28	14,457,600.50	1,721,009.68	39.80978946	-80.71301509
2,795.00	1.99	176.38	2,792.71	-64.21	-3.09	14,457,597.49	1,721,009.87	39.80978120	-80.71301445
2,864.00	2.52	170.92	2,861.65	-66.90	-2.78	14,457,594.80	1,721,010.18	39.80977380	-80.71301336
2,953.00	2.70	182.20	2,950.56	-70.93	-2.55	14,457,590.77	1,721,010.41	39.80976274	-80.71301259
2,984.00	2.78	175.59	2,981.53	-72.41	-2.52	14,457,589.29	1,721,010.44	39.80975868	-80.71301250
3,079.00	1.68	185.02	3,076.45	-76.09	-2.47	14,457,585.61	1,721,010.50	39.80974856	-80.71301235
3,173.00	1.02	181.19	3,170.43	-78.30	-2.60	14,457,583.40	1,721,010.36	39.80974250	-80.71301287
3,268.00	0.31	345.38	3,265.42	-78.90	-2.69	14,457,582.80	1,721,010.28	39.80974086	-80.71301317
3,363.00	1.19	340.49	3,360.41	-77.72	-3.08	14,457,583.98	1,721,009.88	39.80974410	-80.71301456
3,457.00	1.59	17.08	3,454.39	-75.55	-3.02	14,457,586.15	1,721,009.94	39.80975005	-80.71301433
3,552.00	1.02	60.49	3,549.37	-73.87	-1.90	14,457,587.83	1,721,011.06	39.80975464	-80.71301031
3,646.00	0.88	83.71	3,643.35	-73.38	-0.45	14,457,588.32	1,721,012.51	39.80975598	-80.71300516
3,741.00	0.80	76.79	3,738.34	-73.15	0.92	14,457,588.55	1,721,013.88	39.80975660	-80.71300027
3,835.00	0.71	80.40	3,832.33	-72.90	2.13	14,457,588.79	1,721,015.09	39.80975727	-80.71299595

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-08 HU (slot H)
Project:	Marshall County, West Virgin	TVD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Site:	Heaven Hill 2	MD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Well:	Heaven Hill 2-08 HU (slot H)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Jul2216dt_v14

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

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,930.00	0.62	77.72	3,927.33	-72.70	3.21	14,457,589.00	1,721,016.17	39.80975783	-80.71299209
4,025.00	0.31	19.59	4,022.32	-72.35	3.80	14,457,589.35	1,721,016.76	39.80975879	-80.71298999
4,120.00	1.02	318.41	4,117.32	-71.47	3.33	14,457,590.23	1,721,016.29	39.80976120	-80.71299168
4,214.00	0.80	315.50	4,211.31	-70.38	2.31	14,457,591.32	1,721,015.27	39.80976421	-80.71299528
4,309.00	0.71	329.30	4,306.30	-69.40	1.54	14,457,592.30	1,721,014.51	39.80976691	-80.71299799
4,403.00	0.31	82.08	4,400.30	-68.86	1.50	14,457,592.84	1,721,014.46	39.80976838	-80.71299815
4,498.00	0.22	147.21	4,495.30	-68.98	1.85	14,457,592.72	1,721,014.81	39.80976805	-80.71299689
4,593.00	0.22	154.48	4,590.29	-69.30	2.03	14,457,592.40	1,721,014.99	39.80976718	-80.71299626
4,687.00	0.49	260.82	4,684.29	-69.52	1.71	14,457,592.17	1,721,014.67	39.80976655	-80.71299740
4,782.00	0.40	272.01	4,779.29	-69.58	0.98	14,457,592.12	1,721,013.94	39.80976642	-80.71300001
4,877.00	0.22	323.61	4,874.29	-69.42	0.54	14,457,592.28	1,721,013.50	39.80976685	-80.71300158
4,971.00	2.21	309.38	4,968.26	-68.12	-0.97	14,457,593.57	1,721,011.99	39.80977042	-80.71300693
5,066.00	4.02	293.69	5,063.12	-65.62	-5.44	14,457,596.08	1,721,007.53	39.80977733	-80.71302280
5,164.00	2.78	253.81	5,160.96	-64.91	-10.86	14,457,596.79	1,721,002.10	39.80977935	-80.71304213
5,256.00	4.11	234.90	5,252.79	-67.42	-15.70	14,457,594.27	1,720,997.26	39.80977248	-80.71305939
5,350.00	6.10	232.61	5,346.42	-72.39	-22.43	14,457,589.30	1,720,990.53	39.80975889	-80.71308340
5,445.00	8.71	231.51	5,440.62	-79.94	-32.07	14,457,581.76	1,720,980.89	39.80973826	-80.71311782
5,540.00	9.99	232.80	5,534.35	-89.40	-44.27	14,457,572.30	1,720,968.70	39.80971239	-80.71316135
5,634.00	10.91	208.60	5,626.84	-102.14	-55.02	14,457,559.56	1,720,957.94	39.80967748	-80.71319980
5,729.00	12.02	197.58	5,719.95	-119.47	-62.32	14,457,542.23	1,720,950.65	39.80962996	-80.71322596
5,824.00	12.99	196.08	5,812.70	-139.16	-68.26	14,457,522.54	1,720,944.70	39.80957594	-80.71324736
5,918.00	15.38	196.79	5,903.82	-161.25	-74.79	14,457,500.45	1,720,938.17	39.80951534	-80.71327086
6,013.00	15.29	202.29	5,995.45	-184.90	-83.18	14,457,476.80	1,720,929.78	39.80945045	-80.71330100
6,107.00	14.49	210.49	6,086.30	-206.50	-93.85	14,457,455.20	1,720,919.11	39.80939122	-80.71333924
6,202.00	14.18	213.18	6,178.34	-226.48	-106.25	14,457,435.21	1,720,906.71	39.80933645	-80.71338362
6,296.00	13.39	218.91	6,269.64	-244.59	-119.39	14,457,417.11	1,720,893.58	39.80928684	-80.71343061
6,391.00	13.39	224.11	6,362.06	-261.05	-133.95	14,457,400.65	1,720,879.01	39.80924177	-80.71348266
6,486.00	13.30	223.89	6,454.49	-276.82	-149.18	14,457,384.88	1,720,863.78	39.80919859	-80.71353708
6,580.00	12.59	223.01	6,546.10	-292.11	-163.67	14,457,369.59	1,720,849.29	39.80915675	-80.71358883
6,675.00	13.08	222.70	6,638.73	-307.58	-178.02	14,457,354.12	1,720,834.94	39.80911438	-80.71364012
6,769.00	12.99	224.28	6,730.31	-322.96	-192.61	14,457,338.74	1,720,820.35	39.80907227	-80.71369224
6,864.00	12.99	227.02	6,822.88	-337.88	-207.88	14,457,323.82	1,720,805.09	39.80903142	-80.71374677
6,959.00	13.39	233.58	6,915.38	-351.69	-224.54	14,457,310.01	1,720,788.42	39.80899364	-80.71380627
7,054.00	14.49	235.92	7,007.58	-364.88	-243.24	14,457,296.82	1,720,769.73	39.80895758	-80.71387299
7,148.00	12.99	230.59	7,098.89	-378.18	-261.14	14,457,283.52	1,720,751.82	39.80892122	-80.71393690
7,247.00	9.99	211.02	7,195.93	-392.61	-274.17	14,457,269.09	1,720,738.79	39.80888170	-80.71398346
7,342.00	10.30	201.90	7,289.45	-407.56	-281.59	14,457,254.14	1,720,731.38	39.80884073	-80.71401003
7,436.00	11.71	202.51	7,381.72	-424.17	-288.37	14,457,237.53	1,720,724.59	39.80879517	-80.71403439
7,531.00	11.80	209.08	7,474.73	-441.56	-296.78	14,457,220.14	1,720,716.18	39.80874747	-80.71406454
7,626.00	11.31	210.71	7,567.81	-458.06	-306.26	14,457,203.64	1,720,706.70	39.80870225	-80.71409848
7,720.00	10.78	208.99	7,660.07	-473.67	-315.23	14,457,188.02	1,720,697.73	39.80865944	-80.71413059
7,815.00	11.62	212.69	7,753.26	-489.50	-324.70	14,457,172.20	1,720,688.26	39.80861607	-80.71416450
7,910.00	12.59	217.72	7,846.15	-505.74	-336.21	14,457,155.96	1,720,676.76	39.80857157	-80.71420564
8,005.00	13.79	222.39	7,938.64	-522.29	-350.17	14,457,139.40	1,720,662.79	39.80852623	-80.71425557
8,099.00	14.58	225.61	8,029.78	-538.85	-366.18	14,457,122.85	1,720,646.78	39.80848092	-80.71431276
8,194.00	12.90	223.31	8,122.05	-554.93	-382.00	14,457,106.77	1,720,630.96	39.80843689	-80.71436927
8,288.00	12.42	221.90	8,213.77	-570.09	-395.95	14,457,091.61	1,720,617.01	39.80839538	-80.71441911
8,383.00	12.28	220.32	8,306.57	-585.39	-409.31	14,457,076.31	1,720,603.65	39.80835346	-80.71446686
8,477.00	12.28	219.30	8,398.42	-600.75	-422.11	14,457,060.95	1,720,590.85	39.80831140	-80.71451261
8,571.00	12.28	216.88	8,490.27	-616.48	-434.44	14,457,045.22	1,720,578.52	39.80826830	-80.71455670
8,666.00	11.80	212.61	8,583.18	-632.75	-445.74	14,457,028.95	1,720,567.22	39.80822374	-80.71459711
8,761.00	11.40	208.29	8,676.24	-649.20	-455.42	14,457,012.50	1,720,557.54	39.80817865	-80.71463179
8,855.00	12.02	209.21	8,768.29	-665.92	-464.60	14,456,995.78	1,720,548.36	39.80813280	-80.71466466
8,950.00	12.90	209.79	8,861.05	-683.76	-474.70	14,456,977.94	1,720,538.26	39.80808390	-80.71470081
9,044.00	14.01	209.79	8,952.47	-702.74	-485.57	14,456,958.96	1,720,527.40	39.80803187	-80.71473972

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-08 HU (slot H)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Site:	Heaven Hill 2	MD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Well:	Heaven Hill 2-08 HU (slot H)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Jul2216dt_v14

RECEIVED
Office of Oil and Gas
JUL 1 0 2020
WV Department of
Environmental Protection

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,139.00	14.41	214.90	9,044.56	-722.41	-498.04	14,456,939.28	1,720,514.92	39.80797794	-80.71478437
9,234.00	14.18	217.41	9,136.62	-741.35	-511.88	14,456,920.35	1,720,501.09	39.80792606	-80.71483384
9,328.00	14.01	220.89	9,227.79	-759.10	-526.32	14,456,902.60	1,720,486.64	39.80787744	-80.71488547
9,423.00	13.61	221.51	9,320.05	-776.16	-541.25	14,456,885.54	1,720,471.71	39.80783072	-80.71493885
9,518.00	13.30	223.18	9,412.44	-792.50	-556.14	14,456,869.20	1,720,456.82	39.80778598	-80.71499204
9,612.00	14.41	217.72	9,503.71	-809.64	-570.70	14,456,852.06	1,720,442.27	39.80773904	-80.71504406
9,707.00	13.30	215.91	9,595.94	-827.84	-584.34	14,456,833.86	1,720,428.62	39.80768917	-80.71509284
9,801.00	10.69	215.38	9,687.88	-843.71	-595.73	14,456,817.99	1,720,417.23	39.80764569	-80.71513358
9,896.00	9.90	212.61	9,781.35	-857.77	-605.23	14,456,803.93	1,720,407.73	39.80760716	-80.71516758
9,990.00	9.81	210.31	9,873.97	-871.49	-613.63	14,456,790.21	1,720,399.33	39.80756955	-80.71519763
10,084.00	10.21	209.30	9,966.54	-885.67	-621.75	14,456,776.03	1,720,391.22	39.80753068	-80.71522670
10,179.00	12.28	216.70	10,059.71	-901.12	-631.91	14,456,760.58	1,720,381.06	39.80748835	-80.71526305
10,274.00	11.89	212.78	10,152.61	-917.44	-643.24	14,456,744.25	1,720,369.72	39.80744361	-80.71530360
10,369.00	10.78	210.01	10,245.75	-933.37	-652.98	14,456,728.33	1,720,359.98	39.80739997	-80.71533848
10,463.00	11.49	221.42	10,338.00	-948.00	-663.58	14,456,713.70	1,720,349.38	39.80735987	-80.71537636
Survey @ 10463.00 MD 10338.00 TVD - Tie into original hole @ 10463 MD									
10,560.00	12.00	222.50	10,432.96	-962.68	-676.78	14,456,699.02	1,720,336.18	39.80731967	-80.71542354
10,638.00	10.95	224.90	10,509.40	-973.91	-687.49	14,456,687.79	1,720,325.47	39.80728894	-80.71546179
10,732.00	14.86	231.58	10,601.02	-987.73	-703.24	14,456,673.97	1,720,309.72	39.80725112	-80.71551804
10,827.00	17.36	203.72	10,692.42	-1,008.31	-718.51	14,456,653.39	1,720,294.45	39.80719474	-80.71557265
10,921.00	19.08	187.90	10,781.75	-1,036.38	-726.27	14,456,625.32	1,720,286.69	39.80711770	-80.71560059
11,016.00	19.12	180.69	10,871.54	-1,067.32	-728.59	14,456,594.37	1,720,284.37	39.80703275	-80.71560921
11,110.00	20.53	169.44	10,960.00	-1,098.94	-725.76	14,456,562.76	1,720,287.21	39.80694591	-80.71559947
11,204.00	24.75	165.49	11,046.74	-1,134.21	-717.80	14,456,527.49	1,720,295.16	39.80684898	-80.71557154
11,299.00	31.08	163.64	11,130.64	-1,177.03	-705.90	14,456,484.67	1,720,307.06	39.80673127	-80.71552965
11,394.00	36.62	164.26	11,209.51	-1,227.87	-691.29	14,456,433.83	1,720,321.67	39.80659152	-80.71547822
11,488.00	42.15	164.43	11,282.13	-1,285.28	-675.21	14,456,376.42	1,720,337.75	39.80643372	-80.71542160
11,583.00	48.62	164.26	11,348.82	-1,350.36	-656.97	14,456,311.34	1,720,356.00	39.80625483	-80.71535737
11,678.00	56.04	162.94	11,406.84	-1,422.43	-635.71	14,456,239.26	1,720,377.25	39.80605672	-80.71528250
11,772.00	61.05	156.70	11,455.91	-1,497.58	-607.97	14,456,164.12	1,720,404.99	39.80585011	-80.71518457
11,867.00	62.81	156.61	11,500.61	-1,574.54	-574.75	14,456,087.16	1,720,438.21	39.80563847	-80.71506717
11,962.00	68.18	154.33	11,540.00	-1,653.13	-538.85	14,456,008.57	1,720,474.12	39.80542233	-80.71494022
12,056.00	72.66	152.92	11,571.50	-1,732.44	-499.50	14,455,929.26	1,720,513.46	39.80520417	-80.71480102
12,151.00	75.16	150.72	11,597.83	-1,812.88	-456.39	14,455,848.81	1,720,556.57	39.80498287	-80.71464843
12,245.00	78.77	149.23	11,619.03	-1,892.15	-410.57	14,455,769.55	1,720,602.39	39.80476478	-80.71448618
12,340.00	86.37	146.68	11,631.30	-1,971.93	-360.61	14,455,689.77	1,720,652.35	39.80454526	-80.71430921
12,434.00	88.70	147.56	11,635.35	-2,050.79	-309.63	14,455,610.91	1,720,703.33	39.80432824	-80.71412859
12,529.00	89.36	150.28	11,636.96	-2,132.13	-260.60	14,455,529.57	1,720,752.36	39.80410442	-80.71395494
12,624.00	89.23	151.08	11,638.13	-2,214.96	-214.09	14,455,446.74	1,720,798.88	39.80387656	-80.71379026
12,719.00	89.19	150.99	11,639.43	-2,298.07	-168.08	14,455,363.63	1,720,844.88	39.80364792	-80.71362741
12,814.00	89.27	150.81	11,640.71	-2,381.07	-121.89	14,455,280.63	1,720,891.08	39.80341957	-80.71346387
12,909.00	89.32	151.51	11,641.88	-2,464.28	-76.07	14,455,197.42	1,720,936.90	39.80319065	-80.71330167
13,004.00	89.27	151.69	11,643.05	-2,547.84	-30.88	14,455,113.86	1,720,982.08	39.80296077	-80.71314176
13,098.00	88.92	152.04	11,644.53	-2,630.72	13.44	14,455,030.98	1,721,026.40	39.80273277	-80.71298490
13,193.00	89.10	152.75	11,646.18	-2,714.89	57.45	14,454,946.81	1,721,070.41	39.80250122	-80.71282915
13,288.00	88.92	151.25	11,647.82	-2,798.76	102.04	14,454,862.94	1,721,115.00	39.80227051	-80.71267134
13,382.00	88.79	151.08	11,649.70	-2,881.09	147.37	14,454,780.61	1,721,160.33	39.80204402	-80.71251090
13,477.00	89.01	150.64	11,651.52	-2,964.05	193.62	14,454,697.65	1,721,206.58	39.80181578	-80.71234717
13,572.00	88.62	149.84	11,653.48	-3,046.50	240.76	14,454,615.20	1,721,253.72	39.80158893	-80.71218026
13,667.00	88.53	150.28	11,655.85	-3,128.79	288.16	14,454,532.90	1,721,301.12	39.80136250	-80.71201244
13,762.00	88.40	150.72	11,658.39	-3,211.45	334.93	14,454,450.25	1,721,347.89	39.80113510	-80.71184689
13,857.00	88.79	148.88	11,660.72	-3,293.53	382.70	14,454,368.17	1,721,395.66	39.80090927	-80.71167775
13,951.00	88.40	148.17	11,663.03	-3,373.67	431.76	14,454,288.03	1,721,444.72	39.80068874	-80.71150398
14,046.00	87.87	148.17	11,666.12	-3,454.34	481.84	14,454,207.36	1,721,494.80	39.80046676	-80.71132661
14,141.00	89.49	148.53	11,668.31	-3,535.19	531.67	14,454,126.51	1,721,544.63	39.80024429	-80.71115011

RECEIVED
Office of Oil and Gas

JUL 1 0 2024

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-08 HU (slot H)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Site:	Heaven Hill 2	MD Reference:	RKB=1331+33 @ 1364.00usft (Nabors X08)
Well:	Heaven Hill 2-08 HU (slot H)	North Reference:	Grid
Wellbore:	Sidetrack 02	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 02	Database:	DB_Jul2216dt_v14

RECEIVED
Office of Oil and Gas
JUL 1 0 2020
WV Department of
Environmental Protection

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,235.00	89.54	149.32	11,669.10	-3,615.70	580.19	14,454,046.00	1,721,593.15	39.80002277	-80.71097830
14,330.00	89.14	149.32	11,670.20	-3,697.39	628.66	14,453,964.31	1,721,641.62	39.79979798	-80.71080667
14,425.00	88.70	148.79	11,671.99	-3,778.86	677.50	14,453,882.84	1,721,690.46	39.79957382	-80.71063371
14,520.00	90.11	150.55	11,672.97	-3,860.84	725.47	14,453,800.86	1,721,738.43	39.79934824	-80.71046388
14,615.00	89.41	149.67	11,673.37	-3,943.20	772.81	14,453,718.49	1,721,785.77	39.79912163	-80.71029628
14,709.00	89.36	150.11	11,674.38	-4,024.52	819.96	14,453,637.18	1,721,832.92	39.79889791	-80.71012933
14,804.00	89.05	150.28	11,675.70	-4,106.94	867.18	14,453,554.76	1,721,880.14	39.79867113	-80.70996218
14,899.00	89.41	149.84	11,676.97	-4,189.26	914.58	14,453,472.44	1,721,927.55	39.79844465	-80.70979434
14,993.00	89.54	149.23	11,677.84	-4,270.27	962.24	14,453,391.42	1,721,975.20	39.79822173	-80.70962561
15,088.00	88.09	150.46	11,679.80	-4,352.40	1,009.95	14,453,309.30	1,722,022.91	39.79799578	-80.70945669
15,182.00	87.69	150.28	11,683.26	-4,434.05	1,056.39	14,453,227.65	1,722,069.36	39.79777113	-80.70929229
15,277.00	87.38	150.20	11,687.35	-4,516.44	1,103.50	14,453,145.26	1,722,116.47	39.79754443	-80.70912552
15,372.00	88.53	150.90	11,690.74	-4,599.11	1,150.18	14,453,062.59	1,722,163.14	39.79731698	-80.70896029
15,467.00	88.75	151.16	11,692.99	-4,682.20	1,196.18	14,452,979.50	1,722,209.14	39.79708838	-80.70879748
15,561.00	88.09	150.64	11,695.58	-4,764.31	1,241.88	14,452,897.39	1,722,254.84	39.79686250	-80.70863574
15,656.00	88.31	150.90	11,698.57	-4,847.17	1,288.25	14,452,814.53	1,722,301.21	39.79663453	-80.70847163
15,751.00	88.84	150.46	11,700.93	-4,929.97	1,334.75	14,452,731.73	1,722,347.71	39.79640671	-80.70830702
15,845.00	88.84	146.15	11,702.83	-5,009.92	1,384.12	14,452,651.78	1,722,397.08	39.79618672	-80.70813219
15,940.00	89.01	144.04	11,704.62	-5,087.81	1,438.47	14,452,573.89	1,722,451.43	39.79597232	-80.70793961
16,035.00	90.42	145.36	11,705.09	-5,165.34	1,493.36	14,452,496.36	1,722,506.32	39.79575891	-80.70774508
16,129.00	90.42	147.74	11,704.40	-5,243.76	1,545.17	14,452,417.94	1,722,558.13	39.79554308	-80.70756155
16,224.00	88.84	149.84	11,705.01	-5,325.00	1,594.39	14,452,336.70	1,722,607.35	39.79531953	-80.70738726
16,319.00	89.89	151.34	11,706.07	-5,407.75	1,641.03	14,452,253.95	1,722,654.00	39.79509186	-80.70722216
16,414.00	89.71	151.69	11,706.40	-5,491.25	1,686.34	14,452,170.45	1,722,699.30	39.79486214	-80.70706183
16,508.00	89.63	152.75	11,706.94	-5,574.41	1,730.15	14,452,087.29	1,722,743.11	39.79463336	-80.70690683
16,603.00	89.89	150.72	11,707.34	-5,658.08	1,775.14	14,452,003.62	1,722,788.10	39.79440319	-80.70674766
16,698.00	88.75	150.81	11,708.47	-5,740.97	1,821.53	14,451,920.73	1,722,834.49	39.79417513	-80.70658346
16,793.00	88.26	149.67	11,710.94	-5,823.41	1,868.67	14,451,838.29	1,722,881.63	39.79394830	-80.70641661
16,888.00	88.70	153.01	11,713.46	-5,906.73	1,914.21	14,451,754.97	1,722,927.17	39.79371907	-80.70625546
16,983.00	88.31	153.10	11,715.94	-5,991.39	1,957.24	14,451,670.31	1,722,970.20	39.79348619	-80.70610325
17,077.00	88.18	150.20	11,718.82	-6,074.07	2,001.85	14,451,587.63	1,723,014.81	39.79325873	-80.70594540
17,172.00	90.51	151.08	11,719.91	-6,156.86	2,048.42	14,451,504.84	1,723,061.39	39.79303096	-80.70578058
17,267.00	91.21	150.64	11,718.48	-6,239.82	2,094.68	14,451,421.88	1,723,107.64	39.79280270	-80.70561688
17,361.00	89.19	150.28	11,718.15	-6,321.60	2,141.02	14,451,340.10	1,723,153.98	39.79257770	-80.70545286
17,456.00	89.32	150.02	11,719.39	-6,403.99	2,188.30	14,451,257.71	1,723,201.26	39.79235101	-80.70528551
17,551.00	88.48	150.20	11,721.21	-6,486.33	2,235.63	14,451,175.36	1,723,248.60	39.79212443	-80.70511797
17,645.00	89.19	150.90	11,723.12	-6,568.17	2,281.84	14,451,093.53	1,723,294.80	39.79189927	-80.70495444
17,740.00	88.84	150.28	11,724.76	-6,650.91	2,328.48	14,451,010.78	1,723,341.44	39.79167161	-80.70478936
17,835.00	88.31	149.76	11,727.12	-6,733.18	2,375.94	14,450,928.52	1,723,388.90	39.79144527	-80.70462139
17,930.00	90.24	150.11	11,728.32	-6,815.39	2,423.53	14,450,846.31	1,723,436.49	39.79121907	-80.70445295
18,024.00	89.41	149.67	11,728.61	-6,896.70	2,470.68	14,450,765.00	1,723,483.64	39.79099533	-80.70428604
18,119.00	89.32	149.76	11,729.66	-6,978.73	2,518.59	14,450,682.97	1,723,531.55	39.79076962	-80.70411646
18,214.00	88.79	149.49	11,731.23	-7,060.68	2,566.62	14,450,601.02	1,723,579.58	39.79054414	-80.70394644
18,308.00	88.31	150.11	11,733.61	-7,141.89	2,613.89	14,450,519.81	1,723,626.85	39.79032067	-80.70377913
18,403.00	88.75	150.90	11,736.04	-7,224.55	2,660.64	14,450,437.15	1,723,673.60	39.79009324	-80.70361365
18,498.00	89.76	151.51	11,737.28	-7,307.80	2,706.40	14,450,353.90	1,723,719.36	39.78986421	-80.70345176
18,592.00	89.23	150.90	11,738.11	-7,390.17	2,751.67	14,450,271.53	1,723,764.64	39.78963758	-80.70329155
18,687.00	88.31	151.25	11,740.15	-7,473.30	2,797.61	14,450,188.40	1,723,810.57	39.78940887	-80.70312901
18,782.00	89.14	151.69	11,742.26	-7,556.74	2,842.97	14,450,104.96	1,723,855.93	39.78917931	-80.70296851
18,876.00	89.27	151.69	11,743.57	-7,639.49	2,887.55	14,450,022.21	1,723,900.51	39.78895165	-80.70281081
Survey @ 18876.00 MD 11743.57 TVD ST2									
18,953.00	89.27	151.69	11,744.55	-7,707.28	2,924.06	14,449,954.42	1,723,937.02	39.78876516	-80.70268163
Survey projected to 18953.00 MD 11744.55 TVD ST2									

Company:	Tug Hill Operating LLC	**Local Co-ordinate Reference:**	Well Heaven Hill 2-08 HU (slot H)
Project:	Marshall County, West Virginia	**TVD Reference:**	RKB=1331+33 @ 1364.00usft (Nabors X08)
Site:	Heaven Hill 2	**MD Reference:**	RKB=1331+33 @ 1364.00usft (Nabors X08)
Well:	Heaven Hill 2-08 HU (slot H)	**North Reference:**	Grid
Wellbore:	Sidetrack 02	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys Sidetrack 02	**Database:**	DB_Jul2216dt_v14

RECEIVED
Office of Oil and Gas
JUL 1 0 2020
WV Department of
Environmental Protection

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
10,463.00	10,338.00	-948.00	-663.58	Survey @ 10463.00 MD 10338.00 TVD
10,463.00	10,338.00	-948.00	-663.58	Tie into original hole @ 10463 MD
18,876.00	11,743.57	-7,639.49	2,887.55	Survey @ 18876.00 MD 11743.57 TVD ST2
18,953.00	11,744.55	-7,707.28	2,924.06	Survey projected to 18953.00 MD 11744.55 TVD ST2