

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Weller 3 HM (G)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B2 28)
Site:	Lily/Weller	MD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B2 28)
Well:	Weller 3 HM (G)	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	Lily/Weller				
Site Position:		Northing:	14,431,189.55 usft	Latitude:	39.73745061
From:	Lat/Long	Easting:	1,694,826.67 usft	Longitude:	-80.80645320
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.124 °

Well	Weller 3 HM (G)					
Well Position	+N/-S	0.00 usft	Northing:	14,431,139.07 usft	Latitude:	39.73731167
	+E/-W	0.00 usft	Easting:	1,694,877.98 usft	Longitude:	-80.80627108
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,273.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/17/2019	-8.668	66.778	51,947.76344316

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	131.92	

Survey Program	Date 5/2/2019				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
185.00	979.00	MWD surf (Original Hole)	MWD	MWD - Standard	<p>RECEIVED Office of Oil and Gas</p> <p>JUN 10 2020</p> <p>WV Department of Environmental Protection</p>
1,076.00	2,758.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,866.00	15,542.00	MWD (Original Hole)	MWD	MWD - Standard	
15,594.00	15,594.00	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	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
185.00	0.15	22.32	185.00	0.22	0.09	14,431,139.30	1,694,878.07	39.73731229	-80.80627075	
MWD surveys										
215.00	0.13	80.41	215.00	0.27	0.14	14,431,139.34	1,694,878.12	39.73731240	-80.80627058	
245.00	0.09	133.16	245.00	0.26	0.19	14,431,139.33	1,694,878.17	39.73731237	-80.80627040	
275.00	0.10	63.02	275.00	0.25	0.23	14,431,139.33	1,694,878.21	39.73731236	-80.80627025	
305.00	0.25	71.53	305.00	0.28	0.32	14,431,139.36	1,694,878.29	39.73731245	-80.80626995	
335.00	0.23	177.09	335.00	0.24	0.38	14,431,139.32	1,694,878.36	39.73731234	-80.80626972	
365.00	0.07	109.44	365.00	0.18	0.40	14,431,139.25	1,694,878.38	39.73731216	-80.80626965	

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Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Survey										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		
396.00	0.31	207.41	396.00	0.10	0.38	14,431,139.17	1,694,878.36	39.73731194	-80.80626972		
426.00	0.19	67.05	426.00	0.04	0.39	14,431,139.12	1,694,878.37	39.73731179	-80.80626969		
456.00	0.44	110.05	456.00	0.02	0.54	14,431,139.10	1,694,878.52	39.73731174	-80.80626914		
486.00	0.25	227.98	486.00	-0.06	0.60	14,431,139.02	1,694,878.58	39.73731151	-80.80626893		
516.00	0.18	156.05	516.00	-0.15	0.57	14,431,138.93	1,694,878.55	39.73731127	-80.80626904		
547.00	0.31	219.96	547.00	-0.25	0.54	14,431,138.82	1,694,878.52	39.73731097	-80.80626916		
576.00	0.06	291.26	576.00	-0.31	0.48	14,431,138.76	1,694,878.45	39.73731082	-80.80626939		
607.00	0.42	185.52	607.00	-0.42	0.45	14,431,138.66	1,694,878.42	39.73731053	-80.80626948		
637.00	0.17	8.82	637.00	-0.48	0.45	14,431,138.59	1,694,878.42	39.73731035	-80.80626950		
667.00	0.23	302.97	667.00	-0.40	0.40	14,431,138.67	1,694,878.38	39.73731056	-80.80626965		
697.00	0.31	53.44	697.00	-0.32	0.42	14,431,138.75	1,694,878.39	39.73731078	-80.80626960		
728.00	0.15	290.27	728.00	-0.26	0.45	14,431,138.81	1,694,878.42	39.73731096	-80.80626950		
759.00	0.33	107.91	759.00	-0.27	0.49	14,431,138.80	1,694,878.47	39.73731092	-80.80626933		
790.00	0.20	124.73	790.00	-0.33	0.62	14,431,138.74	1,694,878.60	39.73731076	-80.80626887		
821.00	0.33	36.58	821.00	-0.29	0.72	14,431,138.78	1,694,878.70	39.73731087	-80.80626852		
852.00	0.50	58.12	852.00	-0.15	0.89	14,431,138.93	1,694,878.86	39.73731126	-80.80626792		
884.00	0.20	119.75	883.99	-0.10	1.06	14,431,138.97	1,694,879.03	39.73731139	-80.80626733		
915.00	0.29	153.67	914.99	-0.20	1.14	14,431,138.88	1,694,879.11	39.73731112	-80.80626704		
947.00	0.27	177.23	946.99	-0.35	1.18	14,431,138.73	1,694,879.15	39.73731071	-80.80626690		
979.00	0.42	192.02	978.99	-0.54	1.16	14,431,138.54	1,694,879.13	39.73731019	-80.80626697		
1,076.00	0.37	31.40	1,075.99	-0.62	1.24	14,431,138.46	1,694,879.22	39.73730997	-80.80626666		
1,171.00	0.58	43.20	1,170.99	0.00	1.73	14,431,139.07	1,694,879.71	39.73731165	-80.80626491		
1,266.00	1.13	81.47	1,265.98	0.49	2.99	14,431,139.56	1,694,880.96	39.73731299	-80.80626044		
1,360.00	1.78	96.35	1,359.95	0.46	5.36	14,431,139.53	1,694,883.33	39.73731291	-80.80625202		
1,455.00	2.74	92.74	1,454.87	0.19	9.09	14,431,139.26	1,694,887.07	39.73731214	-80.80623874		
1,549.00	4.61	81.14	1,548.68	0.66	15.07	14,431,139.74	1,694,893.04	39.73731341	-80.80621747		
1,644.00	6.88	81.17	1,643.19	2.13	24.46	14,431,141.20	1,694,902.44	39.73731736	-80.80618404		
1,738.00	8.87	82.67	1,736.30	3.91	37.22	14,431,142.99	1,694,915.19	39.73732220	-80.80613866		
1,832.00	10.31	80.84	1,828.99	6.18	52.71	14,431,145.25	1,694,930.69	39.73732833	-80.80608353		
1,926.00	12.01	80.62	1,921.21	9.11	70.67	14,431,148.19	1,694,948.64	39.73733627	-80.80601964		
2,021.00	14.24	83.01	2,013.72	12.14	92.02	14,431,151.22	1,694,969.99	39.73734448	-80.80594367		
2,115.00	16.02	83.36	2,104.46	15.05	116.38	14,431,154.13	1,694,994.35	39.73735232	-80.80585699		
2,210.00	17.74	82.32	2,195.36	18.50	143.74	14,431,157.58	1,695,021.72	39.73736163	-80.80575961		
2,305.00	18.41	79.72	2,285.67	23.11	172.85	14,431,162.19	1,695,050.82	39.73737412	-80.80565605		
2,400.00	18.33	74.78	2,375.84	29.71	202.03	14,431,168.79	1,695,080.00	39.73739207	-80.80555221		
2,493.00	20.14	70.85	2,463.65	38.81	231.27	14,431,177.88	1,695,109.24	39.73741687	-80.80544813		
2,587.00	21.82	65.20	2,551.42	51.44	262.42	14,431,190.52	1,695,140.39	39.73745139	-80.80533723		
2,680.00	21.97	62.12	2,637.72	66.83	293.48	14,431,205.90	1,695,171.46	39.73749346	-80.80522659		
2,758.00	23.29	61.02	2,709.71	81.12	319.87	14,431,220.20	1,695,197.85	39.73753256	-80.80513262		
2,866.00	27.67	57.17	2,807.19	105.08	359.64	14,431,244.15	1,695,237.62	39.73759810	-80.80499096		
2,961.00	31.60	55.94	2,889.75	130.99	398.81	14,431,270.06	1,695,276.79	39.73766902	-80.80485142		
3,055.00	32.41	60.83	2,969.47	157.06	441.22	14,431,296.13	1,695,319.20	39.73774038	-80.80470037		
3,149.00	34.84	63.93	3,047.74	181.14	487.34	14,431,320.22	1,695,365.32	39.73780624	-80.80453611		
3,247.00	36.64	65.90	3,127.29	205.39	539.19	14,431,344.46	1,695,417.16	39.73787252	-80.80435150		
3,341.00	35.20	63.66	3,203.41	228.87	589.08	14,431,367.94	1,695,467.05	39.73793669	-80.80417386		
3,435.00	35.80	65.26	3,279.94	252.39	638.33	14,431,391.47	1,695,516.30	39.73800101	-80.80399848		
3,530.00	34.03	63.31	3,357.84	275.96	687.32	14,431,415.04	1,695,565.29	39.73806545	-80.80382403		
3,624.00	33.65	64.04	3,435.92	299.18	734.24	14,431,438.25	1,695,612.21	39.73812892	-80.80365695		
3,718.00	33.70	65.02	3,514.14	321.59	781.29	14,431,460.67	1,695,659.26	39.73819019	-80.80348940		
3,813.00	34.74	65.25	3,592.70	344.05	829.76	14,431,483.13	1,695,707.74	39.73825159	-80.80331679		
3,908.00	32.65	62.80	3,671.74	367.10	877.14	14,431,506.18	1,695,755.12	39.73831460	-80.80314807		
4,003.00	32.90	62.95	3,751.61	390.55	922.92	14,431,529.63	1,695,800.89	39.73837872	-80.80298507		
4,097.00	33.86	63.45	3,830.10	413.87	969.08	14,431,552.94	1,695,847.05	39.73844247	-80.80282067		
4,192.00	35.11	64.58	3,908.41	437.42	1,017.43	14,431,576.50	1,695,895.40	39.73850688	-80.80264849		
4,287.00	32.79	62.30	3,987.21	461.11	1,064.89	14,431,600.19	1,695,942.86	39.73857164	-80.80247948		

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Survey									
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4,381.00	33.25	61.77	4,066.03	485.13	1,110.13	14,431,624.21	1,695,988.10	39.73863734	-80.80231836
4,475.00	33.86	63.37	4,144.37	509.06	1,156.24	14,431,648.14	1,696,034.22	39.73870277	-80.80215413
4,570.00	34.06	64.30	4,223.16	532.46	1,203.87	14,431,671.54	1,696,081.85	39.73876675	-80.80198452
4,665.00	34.60	64.63	4,301.61	555.56	1,252.22	14,431,694.63	1,696,130.19	39.73882988	-80.80181237
4,760.00	32.57	62.16	4,380.75	579.06	1,299.21	14,431,718.13	1,696,177.18	39.73889413	-80.80164503
4,854.00	32.75	62.04	4,459.89	602.79	1,344.04	14,431,741.87	1,696,222.01	39.73895905	-80.80148537
4,948.00	33.86	63.69	4,538.45	626.32	1,389.97	14,431,765.40	1,696,267.95	39.73902339	-80.80132178
5,043.00	36.43	64.45	4,616.13	650.22	1,439.15	14,431,789.30	1,696,317.13	39.73908872	-80.80114664
5,138.00	35.60	62.11	4,692.97	675.33	1,489.04	14,431,814.40	1,696,367.02	39.73915736	-80.80096897
5,232.00	36.18	63.52	4,769.13	700.50	1,538.06	14,431,839.57	1,696,416.04	39.73922618	-80.80079440
5,327.00	34.97	61.73	4,846.40	725.89	1,587.14	14,431,864.97	1,696,465.12	39.73929564	-80.80061961
5,422.00	32.68	57.46	4,925.32	752.59	1,632.75	14,431,891.66	1,696,510.73	39.73936868	-80.80045715
5,516.00	32.77	59.64	5,004.41	779.10	1,676.10	14,431,918.17	1,696,554.07	39.73944121	-80.80030275
5,610.00	33.21	63.57	5,083.26	803.42	1,721.11	14,431,942.49	1,696,599.08	39.73950772	-80.80014245
5,704.00	33.19	64.98	5,161.92	825.76	1,767.47	14,431,964.83	1,696,645.45	39.73956879	-80.79997733
5,799.00	33.71	65.15	5,241.18	847.83	1,814.96	14,431,986.91	1,696,692.93	39.73962913	-80.79980824
5,893.00	31.91	60.69	5,320.19	870.96	1,860.30	14,432,010.04	1,696,738.28	39.73969237	-80.79964676
5,987.00	31.78	61.59	5,400.05	894.90	1,903.74	14,432,033.98	1,696,781.71	39.73975785	-80.79949206
6,082.00	32.74	62.49	5,480.38	918.67	1,948.53	14,432,057.75	1,696,826.50	39.73982285	-80.79933254
6,177.00	32.51	63.37	5,560.39	941.98	1,994.13	14,432,081.05	1,696,872.11	39.73988658	-80.79917012
6,273.00	33.47	63.62	5,640.91	965.31	2,040.91	14,432,104.38	1,696,918.88	39.73995035	-80.79900354
6,403.00	31.82	60.38	5,750.38	998.18	2,102.82	14,432,137.25	1,696,960.80	39.74004024	-80.79878302
6,497.00	32.22	64.33	5,830.09	1,021.28	2,146.96	14,432,160.36	1,697,024.93	39.74010343	-80.79862584
6,592.00	33.27	66.53	5,909.99	1,042.63	2,193.69	14,432,181.71	1,697,071.66	39.74016177	-80.79845943
6,678.00	32.09	67.41	5,982.38	1,060.80	2,236.42	14,432,199.88	1,697,114.39	39.74021141	-80.79830728
6,708.00	32.88	73.56	6,007.69	1,066.17	2,251.59	14,432,205.24	1,697,129.57	39.74022606	-80.79825326
6,734.00	33.63	79.10	6,029.44	1,069.53	2,265.43	14,432,208.60	1,697,143.41	39.74023520	-80.79820399
6,779.00	34.07	82.35	6,066.81	1,073.57	2,290.16	14,432,212.64	1,697,168.14	39.74024612	-80.79811599
6,826.00	35.74	84.20	6,105.36	1,076.71	2,316.87	14,432,215.78	1,697,194.85	39.74025458	-80.79802096
6,874.00	38.37	86.57	6,143.66	1,079.01	2,345.70	14,432,218.09	1,697,223.67	39.74026074	-80.79791840
6,921.00	41.01	91.32	6,179.84	1,079.53	2,375.69	14,432,218.61	1,697,253.66	39.74026198	-80.79781171
6,969.00	42.20	97.21	6,215.74	1,077.14	2,407.44	14,432,216.22	1,697,285.41	39.74025523	-80.79769878
7,016.00	44.13	102.22	6,250.03	1,071.70	2,439.10	14,432,210.77	1,697,317.08	39.74024007	-80.79758618
7,063.00	45.80	105.29	6,283.29	1,063.79	2,471.35	14,432,202.86	1,697,349.33	39.74021816	-80.79747153
7,110.00	48.09	108.72	6,315.38	1,053.73	2,504.18	14,432,192.81	1,697,382.15	39.74019033	-80.79735484
7,158.00	50.86	112.24	6,346.57	1,040.95	2,538.33	14,432,180.02	1,697,416.31	39.74015501	-80.79723343
7,205.00	52.84	114.26	6,375.60	1,026.35	2,572.29	14,432,165.43	1,697,450.26	39.74011472	-80.79711278
7,253.00	56.09	118.48	6,403.51	1,008.99	2,607.25	14,432,148.06	1,697,485.23	39.74006680	-80.79698854
7,300.00	58.51	123.57	6,428.91	988.59	2,641.11	14,432,127.67	1,697,519.09	39.74001059	-80.79686825
7,347.00	61.85	127.00	6,452.28	965.03	2,674.37	14,432,104.10	1,697,552.35	39.73994567	-80.79675012
7,394.00	64.53	132.19	6,473.49	938.29	2,706.66	14,432,077.37	1,697,584.64	39.73987204	-80.79663546
7,442.00	68.57	135.44	6,492.59	907.80	2,738.41	14,432,046.88	1,697,616.39	39.73978811	-80.79652277
7,489.00	72.22	138.69	6,508.36	875.39	2,768.55	14,432,014.46	1,697,646.53	39.73969890	-80.79641582
7,537.00	76.31	141.85	6,521.38	839.86	2,798.06	14,431,978.94	1,697,676.04	39.73960115	-80.79631113
7,584.00	81.27	143.09	6,530.51	803.31	2,826.13	14,431,942.38	1,697,704.11	39.73950059	-80.79621156
7,631.00	87.65	144.49	6,535.05	765.58	2,853.75	14,431,904.66	1,697,731.73	39.73939681	-80.79611362
7,678.00	90.37	146.60	6,535.86	726.84	2,880.33	14,431,865.91	1,697,758.31	39.73929024	-80.79601938
7,750.00	89.49	149.24	6,535.95	665.84	2,918.57	14,431,804.91	1,697,796.55	39.73912248	-80.79588386
7,820.00	89.85	150.29	6,536.35	605.36	2,953.82	14,431,744.44	1,697,831.79	39.73895617	-80.79575896
7,914.00	88.75	151.87	6,537.50	523.10	2,999.27	14,431,662.17	1,697,877.24	39.73872996	-80.79559795
8,008.00	89.41	151.79	6,539.01	440.24	3,043.64	14,431,579.32	1,697,921.61	39.73850214	-80.79544078
8,103.00	90.33	151.96	6,539.23	356.46	3,088.42	14,431,495.53	1,697,966.40	39.73827177	-80.79528216
8,198.00	89.71	149.85	6,539.19	273.45	3,134.61	14,431,412.53	1,698,012.59	39.73804351	-80.79511853
8,292.00	90.73	150.20	6,538.83	192.03	3,181.58	14,431,331.10	1,698,059.55	39.73781960	-80.79495213
8,386.00	89.63	149.50	6,538.54	110.75	3,228.79	14,431,249.82	1,698,106.76	39.73759608	-80.79478485

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Weller 3 HM (G)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B2 28)
Site:	Lily/Weller	MD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B2 28)
Well:	Weller 3 HM (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	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
8,480.00	90.59	149.85	6,538.36	29.61	3,276.25	14,431,168.68	1,698,154.22	39.73737296	-80.79461669
8,574.00	89.23	149.41	6,538.50	-51.49	3,323.77	14,431,087.58	1,698,201.75	39.73714994	-80.79444830
8,669.00	89.85	149.24	6,539.27	-133.19	3,372.24	14,431,005.88	1,698,250.21	39.73692525	-80.79427657
8,763.00	89.49	150.64	6,539.81	-214.55	3,419.32	14,430,924.53	1,698,297.29	39.73670153	-80.79410976
8,858.00	90.55	151.61	6,539.77	-297.73	3,465.19	14,430,841.34	1,698,343.17	39.73647278	-80.79394726
8,953.00	90.02	150.56	6,539.30	-380.89	3,511.13	14,430,758.19	1,698,389.10	39.73624412	-80.79378455
9,047.00	88.53	150.64	6,540.49	-462.77	3,557.27	14,430,676.30	1,698,435.24	39.73601895	-80.79362110
9,142.00	89.23	150.38	6,542.35	-545.45	3,604.02	14,430,593.62	1,698,482.00	39.73579160	-80.79345546
9,236.00	90.11	150.38	6,542.89	-627.16	3,650.48	14,430,511.91	1,698,528.46	39.73556690	-80.79329087
9,331.00	88.62	150.03	6,543.94	-709.60	3,697.68	14,430,429.48	1,698,575.66	39.73534021	-80.79312365
9,426.00	89.45	150.47	6,545.54	-792.06	3,744.81	14,430,347.01	1,698,622.79	39.73511343	-80.79295667
9,520.00	90.24	151.08	6,545.80	-874.10	3,790.71	14,430,264.98	1,698,668.68	39.73488785	-80.79279410
9,616.00	89.10	150.03	6,546.35	-957.69	3,837.90	14,430,181.38	1,698,715.87	39.73465797	-80.79262693
9,711.00	89.67	150.03	6,547.37	-1,039.98	3,885.35	14,430,099.09	1,698,763.33	39.73443167	-80.79245881
9,806.00	90.11	149.33	6,547.55	-1,121.99	3,933.31	14,430,017.08	1,698,811.29	39.73420616	-80.79228890
9,901.00	91.16	149.33	6,546.50	-1,203.69	3,981.77	14,429,935.38	1,698,859.74	39.73398146	-80.79211722
9,996.00	90.07	148.80	6,545.48	-1,285.17	4,030.60	14,429,853.90	1,698,908.57	39.73375738	-80.79194420
10,091.00	91.03	148.36	6,544.57	-1,366.24	4,080.12	14,429,772.83	1,698,958.10	39.73353444	-80.79176872
10,186.00	89.85	150.29	6,543.84	-1,447.94	4,128.58	14,429,691.13	1,699,006.56	39.73330976	-80.79159702
10,281.00	89.01	151.43	6,544.78	-1,530.91	4,174.84	14,429,608.16	1,699,052.81	39.73308160	-80.79143318
10,376.00	89.58	151.35	6,545.95	-1,614.30	4,220.32	14,429,524.77	1,699,098.30	39.73285229	-80.79127207
10,471.00	90.95	151.79	6,545.51	-1,697.84	4,265.55	14,429,441.23	1,699,143.53	39.73262257	-80.79111190
10,566.00	89.63	150.82	6,545.03	-1,781.17	4,311.16	14,429,357.90	1,699,189.14	39.73239343	-80.79095035
10,660.00	88.79	149.59	6,546.33	-1,862.74	4,357.87	14,429,276.34	1,699,235.84	39.73216913	-80.79078491
10,755.00	89.49	150.56	6,547.75	-1,945.06	4,405.25	14,429,194.01	1,699,283.23	39.73194274	-80.79061705
10,849.00	88.57	149.68	6,549.34	-2,026.55	4,452.07	14,429,112.52	1,699,330.05	39.73171864	-80.79045119
10,944.00	89.27	149.68	6,551.14	-2,108.54	4,500.02	14,429,030.53	1,699,378.00	39.73149316	-80.79028132
11,039.00	90.55	149.59	6,551.28	-2,190.51	4,548.04	14,428,948.57	1,699,426.02	39.73126775	-80.79011119
11,134.00	89.36	148.36	6,551.36	-2,271.91	4,597.01	14,428,867.16	1,699,474.98	39.73104387	-80.78993772
11,228.00	90.59	147.22	6,551.40	-2,351.45	4,647.11	14,428,787.63	1,699,525.08	39.73082513	-80.78976018
11,322.00	89.45	147.13	6,551.37	-2,430.44	4,698.06	14,428,708.64	1,699,576.04	39.73060787	-80.78959600
11,417.00	89.05	147.39	6,552.61	-2,510.34	4,749.44	14,428,628.74	1,699,627.41	39.73038811	-80.78939754
11,512.00	88.97	147.39	6,554.25	-2,590.35	4,800.63	14,428,548.73	1,699,678.60	39.73016804	-80.78921614
11,606.00	88.57	148.71	6,556.27	-2,670.09	4,850.36	14,428,468.99	1,699,728.33	39.72994873	-80.78903993
11,701.00	89.63	148.53	6,557.76	-2,751.18	4,899.82	14,428,387.89	1,699,777.79	39.72972571	-80.78886468
11,795.00	89.36	150.64	6,558.59	-2,832.24	4,947.40	14,428,306.84	1,699,825.38	39.72950279	-80.78869612
11,890.00	89.71	151.43	6,559.36	-2,915.35	4,993.41	14,428,223.72	1,699,871.38	39.72927424	-80.78853319
11,985.00	87.96	151.96	6,561.29	-2,998.97	5,038.44	14,428,140.10	1,699,916.42	39.72904430	-80.78837372
12,080.00	88.79	151.96	6,563.99	-3,082.79	5,083.08	14,428,056.29	1,699,961.06	39.72881383	-80.78821565
12,175.00	90.24	152.58	6,564.79	-3,166.87	5,127.28	14,427,972.20	1,700,005.26	39.72858263	-80.78805914
12,268.00	90.73	150.82	6,564.00	-3,248.75	5,171.37	14,427,890.33	1,700,049.34	39.72835748	-80.78790303
12,363.00	89.32	150.03	6,563.96	-3,331.37	5,218.26	14,427,807.71	1,700,096.23	39.72813027	-80.78773696
12,458.00	89.58	148.97	6,564.87	-3,413.22	5,266.47	14,427,725.86	1,700,144.44	39.72790518	-80.78756617
12,554.00	90.86	148.36	6,564.51	-3,495.21	5,316.39	14,427,643.86	1,700,194.37	39.72767967	-80.78738931
12,649.00	90.37	150.47	6,563.49	-3,576.98	5,364.72	14,427,562.09	1,700,242.70	39.72745478	-80.78721810
12,743.00	89.49	149.24	6,563.60	-3,658.27	5,411.93	14,427,480.80	1,700,289.90	39.72723124	-80.78705089
12,839.00	90.68	148.01	6,563.46	-3,740.23	5,461.91	14,427,398.84	1,700,339.88	39.72700583	-80.78687383
12,933.00	89.36	149.68	6,563.43	-3,820.67	5,510.54	14,427,318.41	1,700,388.51	39.72678460	-80.78670155
13,027.00	90.07	151.35	6,563.89	-3,902.49	5,556.80	14,427,236.59	1,700,434.77	39.72655959	-80.78653770
13,121.00	88.44	151.26	6,565.12	-3,984.93	5,601.93	14,427,154.14	1,700,479.90	39.72633288	-80.78637790
13,217.00	89.49	150.91	6,566.85	-4,068.95	5,648.34	14,427,070.12	1,700,526.31	39.72610184	-80.78621355
13,311.00	90.68	150.91	6,566.71	-4,151.09	5,694.04	14,426,987.98	1,700,572.01	39.72587595	-80.78605171
13,406.00	88.84	151.17	6,567.11	-4,234.21	5,740.03	14,426,904.86	1,700,618.01	39.72564739	-80.78588883
13,500.00	90.07	151.87	6,568.00	-4,316.83	5,784.85	14,426,822.25	1,700,662.83	39.72542020	-80.78573012
13,595.00	88.31	151.35	6,569.35	-4,400.39	5,830.02	14,426,738.68	1,700,707.99	39.72519041	-80.78557021

WV Department of Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Weller 3 HM (G)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B2 28)
Site:	Lily/Weller	MD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B2 28)
Well:	Weller 3 HM (G)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,690.00	89.14	151.61	6,571.46	-4,483.84	5,875.36	14,426,655.23	1,700,753.34	39.72496093	-80.78540964
13,785.00	90.51	152.05	6,571.75	-4,567.59	5,920.21	14,426,571.49	1,700,798.19	39.72473065	-80.78525085
13,879.00	90.11	151.43	6,571.24	-4,650.38	5,964.72	14,426,488.69	1,700,842.69	39.72450298	-80.78509328
13,974.00	89.89	151.52	6,571.24	-4,733.85	6,010.08	14,426,405.23	1,700,888.06	39.72427345	-80.78493264
14,069.00	89.36	149.68	6,571.86	-4,816.61	6,056.72	14,426,322.47	1,700,934.69	39.72404586	-80.78476750
14,164.00	88.88	150.03	6,573.32	-4,898.75	6,104.42	14,426,240.32	1,700,982.39	39.72381996	-80.78459855
14,258.00	88.84	149.59	6,575.19	-4,979.98	6,151.68	14,426,159.09	1,701,029.65	39.72359656	-80.78443117
14,352.00	89.89	149.33	6,576.23	-5,060.94	6,199.44	14,426,078.14	1,701,077.42	39.72337392	-80.78426200
14,446.00	88.09	149.41	6,577.89	-5,141.81	6,247.32	14,425,997.27	1,701,125.30	39.72315151	-80.78409240
14,541.00	89.10	149.59	6,580.22	-5,223.63	6,295.52	14,425,915.44	1,701,173.50	39.72292646	-80.78392167
14,635.00	88.44	149.94	6,582.24	-5,304.83	6,342.85	14,425,834.25	1,701,220.82	39.72270317	-80.78375407
14,727.00	89.41	149.68	6,583.96	-5,384.33	6,389.10	14,425,754.74	1,701,267.08	39.72248451	-80.78359025
14,822.00	91.03	149.68	6,583.60	-5,466.34	6,437.06	14,425,672.74	1,701,315.03	39.72225899	-80.78342040
14,917.00	89.10	149.85	6,583.49	-5,548.41	6,484.89	14,425,590.66	1,701,362.87	39.72203328	-80.78325099
15,012.00	90.20	149.50	6,584.07	-5,630.41	6,532.86	14,425,508.67	1,701,410.83	39.72180776	-80.78308112
15,107.00	88.70	148.97	6,584.98	-5,712.03	6,581.45	14,425,427.04	1,701,459.42	39.72158327	-80.78290902
15,202.00	89.36	148.45	6,586.59	-5,793.20	6,630.78	14,425,345.87	1,701,508.76	39.72136003	-80.78273427
15,297.00	90.37	148.45	6,586.82	-5,874.16	6,680.49	14,425,264.91	1,701,558.46	39.72113737	-80.78255819
15,392.00	88.79	148.97	6,587.51	-5,955.34	6,729.82	14,425,183.74	1,701,607.80	39.72091410	-80.78238343
15,487.00	89.76	148.89	6,588.71	-6,036.70	6,778.85	14,425,102.37	1,701,656.82	39.72069033	-80.78220979
15,542.00	90.51	148.89	6,588.58	-6,083.79	6,807.27	14,425,055.28	1,701,685.24	39.72056081	-80.78210914
Survey @ 15542.00 MD 6588.58 TVD									
15,594.00	90.51	148.89	6,588.12	-6,128.31	6,834.13	14,425,010.77	1,701,712.11	39.72043837	-80.78201398
Survey projected to 15594.00 MD 6588.12 TVD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
185.00	185.00	0.22	0.09	MWD surveys	
15,542.00	6,588.58	-6,083.79	6,807.27	Survey @ 15542.00 MD 6588.58 TVD	
15,594.00	6,588.12	-6,128.31	6,834.13	Survey projected to 15594.00 MD 6588.12 TVD	