

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Corley N-05HM (slot F)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Site:	Corley Pad	MD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Well:	Corley N-05HM (slot F)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Jul2216dt_v14

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Project	Marshall County, West Virginia		JUN 10 2020
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		WV Department of Environmental Protection
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Corley Pad				
Site Position:		Northing:	14,436,832.02 usft	Latitude:	39.75286638
From:	Lat/Long	Easting:	1,706,973.98 usft	Longitude:	-80.76319015
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.15 °

Well	Corley N-05HM (slot F)					
Well Position	+N/-S	0.00 usft	Northing:	14,436,859.23 usft	Latitude:	39.75294119
	+E/-W	0.00 usft	Easting:	1,706,964.05 usft	Longitude:	-80.76322524
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,254.00 usft

Wellbore	Sidetrack 01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/2/2018	-8.67	66.86	52,051.94552479

Design	Surveys Sidetrack 01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	3,475.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	322.73	

Survey Program	Date 6/26/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	3,475.00	Gyro Scientific (Original Hole)	NS-GYRO-MS	North sensing gyrocompassing m/s	
3,600.00	16,722.00	MWD ST1 (Sidetrack 01)	MWD	MWD - Standard	
16,769.00	16,769.00	Projection (Sidetrack 01)	NS-GYRO-MS	North sensing gyrocompassing m/s	

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	14,436,859.23	1,706,964.05	39.75294119	-80.76322524	
100.00	0.25	228.57	100.00	-0.14	-0.16	14,436,859.09	1,706,963.89	39.75294080	-80.76322582	
125.00	0.26	215.71	125.00	-0.23	-0.24	14,436,859.01	1,706,963.81	39.75294057	-80.76322609	
150.00	0.29	233.46	150.00	-0.31	-0.32	14,436,858.92	1,706,963.73	39.75294034	-80.76322639	
175.00	0.32	231.41	175.00	-0.39	-0.43	14,436,858.84	1,706,963.62	39.75294012	-80.76322676	
200.00	0.39	243.24	200.00	-0.47	-0.56	14,436,858.76	1,706,963.49	39.75293990	-80.76322723	
225.00	0.34	220.07	225.00	-0.57	-0.68	14,436,858.67	1,706,963.37	39.75293964	-80.76322767	
250.00	0.37	230.00	250.00	-0.68	-0.79	14,436,858.56	1,706,963.26	39.75293934	-80.76322806	
275.00	0.35	223.19	275.00	-0.78	-0.90	14,436,858.45	1,706,963.14	39.75293904	-80.76322847	
300.00	0.38	216.83	300.00	-0.91	-1.01	14,436,858.33	1,706,963.04	39.75293871	-80.76322883	

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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		
325.00	0.31	222.12	325.00	-1.02	-1.10	14,436,858.21	1,706,962.95	39.75293839	-80.76322917		
350.00	0.34	219.72	350.00	-1.13	-1.19	14,436,858.10	1,706,962.85	39.75293810	-80.76322950		
375.00	0.36	200.32	375.00	-1.26	-1.27	14,436,857.97	1,706,962.78	39.75293774	-80.76322977		
400.00	0.41	195.80	399.99	-1.42	-1.32	14,436,857.81	1,706,962.73	39.75293730	-80.76322995		
425.00	0.33	210.51	424.99	-1.57	-1.38	14,436,857.67	1,706,962.67	39.75293689	-80.76323017		
450.00	0.36	201.53	449.99	-1.70	-1.45	14,436,857.53	1,706,962.60	39.75293652	-80.76323041		
475.00	0.35	194.75	474.99	-1.85	-1.50	14,436,857.38	1,706,962.55	39.75293612	-80.76323058		
500.00	0.35	202.39	499.99	-2.00	-1.54	14,436,857.24	1,706,962.51	39.75293572	-80.76323075		
525.00	0.35	189.69	524.99	-2.14	-1.59	14,436,857.09	1,706,962.46	39.75293532	-80.76323090		
550.00	0.37	194.23	549.99	-2.29	-1.62	14,436,856.94	1,706,962.43	39.75293490	-80.76323102		
575.00	0.37	201.54	574.99	-2.45	-1.67	14,436,856.79	1,706,962.38	39.75293448	-80.76323120		
600.00	0.34	197.65	599.99	-2.59	-1.72	14,436,856.64	1,706,962.33	39.75293408	-80.76323139		
625.00	0.33	192.93	624.99	-2.73	-1.76	14,436,856.50	1,706,962.29	39.75293369	-80.76323152		
650.00	0.37	212.73	649.99	-2.87	-1.82	14,436,856.36	1,706,962.23	39.75293332	-80.76323174		
675.00	0.31	209.24	674.99	-3.00	-1.90	14,436,856.23	1,706,962.15	39.75293297	-80.76323201		
700.00	0.28	209.32	699.99	-3.11	-1.96	14,436,856.12	1,706,962.09	39.75293266	-80.76323224		
725.00	0.24	226.88	724.99	-3.20	-2.03	14,436,856.03	1,706,962.02	39.75293242	-80.76323248		
750.00	0.23	228.52	749.99	-3.27	-2.10	14,436,855.96	1,706,961.95	39.75293223	-80.76323275		
775.00	0.22	222.56	774.99	-3.34	-2.17	14,436,855.90	1,706,961.88	39.75293204	-80.76323300		
800.00	0.27	224.11	799.99	-3.42	-2.25	14,436,855.82	1,706,961.80	39.75293183	-80.76323326		
825.00	0.22	222.72	824.99	-3.49	-2.32	14,436,855.74	1,706,961.73	39.75293161	-80.76323353		
850.00	0.22	220.48	849.99	-3.57	-2.38	14,436,855.67	1,706,961.67	39.75293142	-80.76323375		
875.00	0.21	220.84	874.99	-3.64	-2.44	14,436,855.60	1,706,961.60	39.75293122	-80.76323397		
900.00	0.15	216.49	899.99	-3.70	-2.49	14,436,855.54	1,706,961.56	39.75293105	-80.76323415		
925.00	0.20	216.55	924.99	-3.76	-2.54	14,436,855.48	1,706,961.51	39.75293089	-80.76323431		
950.00	0.26	203.02	949.99	-3.85	-2.59	14,436,855.39	1,706,961.46	39.75293065	-80.76323448		
975.00	0.31	201.27	974.99	-3.96	-2.63	14,436,855.27	1,706,961.42	39.75293033	-80.76323465		
1,000.00	0.43	185.58	999.99	-4.12	-2.67	14,436,855.12	1,706,961.37	39.75292990	-80.76323477		
1,025.00	0.58	179.61	1,024.99	-4.34	-2.68	14,436,854.90	1,706,961.37	39.75292930	-80.76323480		
1,050.00	0.75	181.61	1,049.98	-4.63	-2.68	14,436,854.61	1,706,961.37	39.75292850	-80.76323482		
1,075.00	0.85	180.00	1,074.98	-4.98	-2.68	14,436,854.26	1,706,961.36	39.75292754	-80.76323484		
1,100.00	0.91	181.29	1,099.98	-5.36	-2.69	14,436,853.87	1,706,961.36	39.75292649	-80.76323486		
1,125.00	0.95	186.34	1,124.97	-5.77	-2.72	14,436,853.47	1,706,961.33	39.75292538	-80.76323496		
1,150.00	1.01	181.50	1,149.97	-6.19	-2.74	14,436,853.04	1,706,961.30	39.75292421	-80.76323506		
1,175.00	0.98	179.94	1,174.97	-6.63	-2.75	14,436,852.61	1,706,961.30	39.75292302	-80.76323509		
1,200.00	0.95	184.01	1,199.96	-7.05	-2.76	14,436,852.19	1,706,961.28	39.75292186	-80.76323514		
1,225.00	0.93	183.36	1,224.96	-7.46	-2.79	14,436,851.78	1,706,961.26	39.75292074	-80.76323524		
1,250.00	0.95	178.57	1,249.96	-7.87	-2.80	14,436,851.37	1,706,961.25	39.75291961	-80.76323527		
1,275.00	0.91	176.77	1,274.95	-8.27	-2.78	14,436,850.96	1,706,961.27	39.75291850	-80.76323521		
1,300.00	0.94	178.58	1,299.95	-8.67	-2.76	14,436,850.56	1,706,961.28	39.75291739	-80.76323516		
1,325.00	0.97	178.45	1,324.95	-9.09	-2.75	14,436,850.14	1,706,961.29	39.75291625	-80.76323513		
1,350.00	0.90	186.44	1,349.94	-9.50	-2.77	14,436,849.74	1,706,961.28	39.75291513	-80.76323519		
1,375.00	0.97	187.92	1,374.94	-9.90	-2.82	14,436,849.33	1,706,961.23	39.75291402	-80.76323537		
1,400.00	0.87	211.17	1,399.94	-10.27	-2.95	14,436,848.96	1,706,961.10	39.75291300	-80.76323583		
1,425.00	0.85	209.84	1,424.93	-10.60	-3.14	14,436,848.64	1,706,960.91	39.75291211	-80.76323651		
1,450.00	0.99	252.98	1,449.93	-10.82	-3.44	14,436,848.41	1,706,960.61	39.75291150	-80.76323758		
1,475.00	1.50	276.59	1,474.93	-10.85	-3.97	14,436,848.39	1,706,960.08	39.75291143	-80.76323947		
1,500.00	2.33	289.30	1,499.91	-10.64	-4.77	14,436,848.59	1,706,959.27	39.75291200	-80.76324233		
1,525.00	3.20	295.95	1,524.88	-10.17	-5.88	14,436,849.07	1,706,958.17	39.75291331	-80.76324626		
1,550.00	4.01	299.04	1,549.83	-9.44	-7.27	14,436,849.80	1,706,956.78	39.75291532	-80.76325121		
1,575.00	5.06	300.01	1,574.75	-8.46	-8.99	14,436,850.77	1,706,955.06	39.75291802	-80.76325731		
1,600.00	5.72	299.93	1,599.64	-7.29	-11.03	14,436,851.95	1,706,953.02	39.75292125	-80.76326454		
1,625.00	6.54	301.72	1,624.50	-5.92	-13.32	14,436,853.32	1,706,950.73	39.75292503	-80.76327268		
1,650.00	7.10	303.07	1,649.32	-4.33	-15.82	14,436,854.91	1,706,948.23	39.75292942	-80.76328158		
1,675.00	8.33	305.56	1,674.10	-2.43	-18.59	14,436,856.80	1,706,945.46	39.75293465	-80.76329141		

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Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
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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
1,700.00	8.69	306.81	1,698.82	-0.25	-21.58	14,436,858.99	1,706,942.47	39.75294067	-80.76330201
1,725.00	9.06	306.77	1,723.52	2.06	-24.67	14,436,861.30	1,706,939.38	39.75294704	-80.76331298
1,750.00	9.58	306.87	1,748.19	4.49	-27.91	14,436,863.72	1,706,936.14	39.75295372	-80.76332449
1,775.00	10.02	306.02	1,772.83	7.02	-31.33	14,436,866.25	1,706,932.72	39.75296069	-80.76333664
1,800.00	10.33	305.72	1,797.43	9.60	-34.91	14,436,868.84	1,706,929.14	39.75296782	-80.76334935
1,825.00	10.54	304.00	1,822.02	12.19	-38.62	14,436,871.43	1,706,925.43	39.75297495	-80.76336255
1,850.00	11.02	300.01	1,846.58	14.67	-42.59	14,436,873.90	1,706,921.46	39.75298178	-80.76337663
1,875.00	11.50	297.27	1,871.10	17.00	-46.87	14,436,876.24	1,706,917.18	39.75298823	-80.76339185
1,900.00	12.30	293.37	1,895.56	19.20	-51.53	14,436,878.44	1,706,912.52	39.75299430	-80.76340841
1,925.00	12.95	290.78	1,919.96	21.25	-56.60	14,436,880.49	1,706,907.45	39.75299996	-80.76342641
1,950.00	13.61	288.39	1,944.29	23.17	-62.01	14,436,882.41	1,706,902.04	39.75300528	-80.76344564
1,975.00	14.14	287.12	1,968.56	25.00	-67.72	14,436,884.23	1,706,896.33	39.75301034	-80.76346594
2,000.00	14.59	286.76	1,992.78	26.81	-73.65	14,436,886.04	1,706,890.40	39.75301534	-80.76348703
2,025.00	14.93	284.75	2,016.95	28.53	-79.78	14,436,887.77	1,706,884.27	39.75302013	-80.76350882
2,050.00	15.22	283.63	2,041.09	30.13	-86.08	14,436,889.36	1,706,877.97	39.75302456	-80.76353124
2,075.00	15.61	280.72	2,065.19	31.53	-92.58	14,436,890.76	1,706,871.47	39.75302844	-80.76355433
2,100.00	15.85	279.96	2,089.26	32.74	-99.24	14,436,891.98	1,706,864.80	39.75303183	-80.76357804
2,125.00	15.98	278.97	2,113.30	33.87	-106.01	14,436,893.10	1,706,858.04	39.75303498	-80.76360209
2,150.00	16.16	277.12	2,137.32	34.84	-112.86	14,436,894.07	1,706,851.19	39.75303768	-80.76362646
2,175.00	16.34	277.07	2,161.32	35.70	-119.80	14,436,894.94	1,706,844.25	39.75304011	-80.76365115
2,200.00	16.59	274.01	2,185.30	36.38	-126.85	14,436,895.62	1,706,837.20	39.75304203	-80.76367623
2,225.00	16.54	275.68	2,209.26	36.99	-133.95	14,436,896.22	1,706,830.10	39.75304374	-80.76370149
2,250.00	16.06	272.92	2,233.26	37.51	-140.95	14,436,896.75	1,706,823.10	39.75304524	-80.76372637
2,275.00	16.09	271.94	2,257.28	37.81	-147.86	14,436,897.04	1,706,816.19	39.75304609	-80.76375097
2,300.00	15.62	269.80	2,281.33	37.91	-154.69	14,436,897.15	1,706,809.36	39.75304643	-80.76377527
2,325.00	15.48	268.54	2,305.41	37.82	-161.39	14,436,897.05	1,706,802.66	39.75304622	-80.76379911
2,350.00	15.02	266.92	2,329.53	37.56	-167.96	14,436,896.79	1,706,796.09	39.75304555	-80.76382249
2,375.00	14.94	265.62	2,353.68	37.14	-174.41	14,436,896.37	1,706,789.64	39.75304445	-80.76384543
2,400.00	14.74	265.75	2,377.85	36.66	-180.79	14,436,895.89	1,706,783.26	39.75304317	-80.76386815
2,425.00	15.09	264.80	2,402.01	36.12	-187.21	14,436,895.36	1,706,776.84	39.75304176	-80.76389097
2,450.00	14.88	265.64	2,426.16	35.59	-193.65	14,436,894.82	1,706,770.40	39.75304032	-80.76391390
2,475.00	14.97	265.67	2,450.31	35.10	-200.07	14,436,894.33	1,706,763.98	39.75303903	-80.76393675
2,500.00	15.06	265.56	2,474.46	34.60	-206.53	14,436,893.84	1,706,757.52	39.75303772	-80.76395973
2,525.00	15.15	265.50	2,498.60	34.10	-213.02	14,436,893.33	1,706,751.03	39.75303637	-80.76398284
2,550.00	15.36	264.94	2,522.72	33.55	-219.58	14,436,892.78	1,706,744.47	39.75303491	-80.76400617
2,575.00	15.70	263.79	2,546.80	32.89	-226.24	14,436,892.12	1,706,737.81	39.75303315	-80.76402987
2,600.00	16.06	261.89	2,570.85	32.04	-233.02	14,436,891.27	1,706,731.03	39.75303086	-80.76405403
2,625.00	15.69	262.60	2,594.90	31.11	-239.80	14,436,890.35	1,706,724.25	39.75302837	-80.76407814
2,650.00	15.64	262.76	2,618.97	30.25	-246.49	14,436,889.49	1,706,717.56	39.75302606	-80.76410197
2,675.00	15.70	262.23	2,643.04	29.37	-253.19	14,436,888.60	1,706,710.86	39.75302368	-80.76412580
2,700.00	15.61	261.79	2,667.11	28.43	-259.87	14,436,887.67	1,706,704.18	39.75302116	-80.76414958
2,725.00	15.26	260.31	2,691.21	27.40	-266.44	14,436,886.63	1,706,697.61	39.75301836	-80.76417297
2,750.00	14.88	258.72	2,715.35	26.22	-272.83	14,436,885.45	1,706,691.22	39.75301517	-80.76419572
2,775.00	16.02	259.85	2,739.44	24.98	-279.38	14,436,884.22	1,706,684.67	39.75301182	-80.76421902
2,800.00	17.81	260.16	2,763.36	23.72	-286.54	14,436,882.95	1,706,677.51	39.75300841	-80.76424451
2,825.00	20.09	260.39	2,787.01	22.35	-294.54	14,436,881.58	1,706,669.51	39.75300470	-80.76427300
2,850.00	22.33	261.25	2,810.31	20.91	-303.47	14,436,880.14	1,706,660.58	39.75300081	-80.76430478
2,875.00	24.46	263.14	2,833.25	19.57	-313.30	14,436,878.80	1,706,650.75	39.75299720	-80.76433978
2,900.00	24.98	265.95	2,855.96	18.58	-323.71	14,436,877.81	1,706,640.34	39.75299455	-80.76437681
2,925.00	24.72	268.90	2,878.65	18.10	-334.20	14,436,877.34	1,706,629.85	39.75299333	-80.76441414
2,950.00	24.64	269.42	2,901.37	17.95	-344.64	14,436,877.19	1,706,619.41	39.75299299	-80.76445128
2,975.00	24.21	270.04	2,924.13	17.90	-354.98	14,436,877.14	1,706,609.07	39.75299293	-80.76448806
3,000.00	24.52	271.79	2,946.90	18.07	-365.29	14,436,877.30	1,706,598.76	39.75299345	-80.76452475
3,025.00	24.85	273.68	2,969.62	18.57	-375.71	14,436,877.80	1,706,588.33	39.75299490	-80.76456184
3,050.00	24.99	275.01	2,992.29	19.37	-386.22	14,436,878.60	1,706,577.83	39.75299717	-80.76459920

WV Department of Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Corley N-05HM (slot F)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Site:	Corley Pad	MD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Well:	Corley N-05HM (slot F)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	Database:	DB_Jul2216dt_v14

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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
3,075.00	25.26	275.27	3,014.93	20.32	-396.79	14,436,879.55	1,706,567.26	39.75299986	-80.76463681
3,100.00	24.75	275.20	3,037.58	21.28	-407.31	14,436,880.51	1,706,556.74	39.75300258	-80.76467424
3,125.00	24.61	275.19	3,060.30	22.23	-417.71	14,436,881.46	1,706,546.34	39.75300525	-80.76471122
3,150.00	24.05	274.37	3,083.08	23.08	-427.97	14,436,882.32	1,706,536.08	39.75300769	-80.76474773
3,175.00	23.95	273.99	3,105.92	23.83	-438.11	14,436,883.06	1,706,525.94	39.75300979	-80.76478381
3,200.00	23.94	273.22	3,128.77	24.46	-448.24	14,436,883.70	1,706,515.81	39.75301162	-80.76481983
3,225.00	24.77	272.82	3,151.54	25.01	-458.53	14,436,884.24	1,706,505.51	39.75301318	-80.76485645
3,250.00	25.73	272.29	3,174.15	25.48	-469.19	14,436,884.72	1,706,494.86	39.75301456	-80.76489436
3,275.00	25.91	271.40	3,196.66	25.83	-480.07	14,436,885.07	1,706,483.98	39.75301560	-80.76493307
3,300.00	26.00	271.83	3,219.13	26.14	-491.01	14,436,885.37	1,706,473.04	39.75301653	-80.76497198
3,325.00	26.03	271.75	3,241.60	26.48	-501.97	14,436,885.72	1,706,462.08	39.75301755	-80.76501097
3,350.00	25.97	271.50	3,264.07	26.79	-512.92	14,436,886.03	1,706,451.13	39.75301848	-80.76504995
3,375.00	24.79	270.46	3,286.66	26.98	-523.64	14,436,886.21	1,706,440.41	39.75301907	-80.76508806
3,400.00	24.44	270.39	3,309.39	27.06	-534.05	14,436,886.29	1,706,430.00	39.75301935	-80.76512511
3,425.00	23.78	269.37	3,332.21	27.04	-544.26	14,436,886.27	1,706,419.79	39.75301937	-80.76516145
3,450.00	23.02	268.23	3,355.15	26.83	-554.19	14,436,886.06	1,706,409.86	39.75301888	-80.76519676
3,475.00	23.58	268.54	3,378.11	26.55	-564.07	14,436,885.79	1,706,399.98	39.75301818	-80.76523194
Tie into original hole @ 3475 MD									
3,600.00	25.30	287.19	3,492.08	33.82	-614.66	14,436,893.05	1,706,349.39	39.75303851	-80.76541187
3,690.00	27.01	289.92	3,572.86	46.47	-652.25	14,436,905.70	1,706,311.80	39.75307351	-80.76554549
3,780.00	25.91	284.22	3,653.45	58.26	-690.53	14,436,917.50	1,706,273.52	39.75310618	-80.76568159
3,869.00	24.32	282.14	3,734.03	66.89	-727.30	14,436,926.13	1,706,236.75	39.75313015	-80.76581233
3,959.00	24.71	285.06	3,815.92	75.68	-763.59	14,436,934.91	1,706,200.46	39.75315454	-80.76594135
4,049.00	24.51	284.18	3,897.74	85.14	-799.85	14,436,944.37	1,706,164.20	39.75318078	-80.76607029
4,138.00	24.35	289.10	3,978.78	95.67	-835.09	14,436,954.90	1,706,128.96	39.75320994	-80.76619557
4,228.00	26.53	295.26	4,060.07	110.32	-870.81	14,436,969.55	1,706,093.24	39.75325044	-80.76632253
4,318.00	26.36	295.73	4,140.65	127.57	-906.99	14,436,986.81	1,706,057.06	39.75329808	-80.76645109
4,408.00	25.50	300.34	4,221.60	146.03	-941.71	14,437,005.27	1,706,022.34	39.75334903	-80.76657446
4,497.00	24.92	298.56	4,302.12	164.68	-974.72	14,437,023.91	1,705,989.33	39.75340046	-80.76669172
4,587.00	25.55	299.51	4,383.53	183.30	-1,008.26	14,437,042.53	1,705,955.79	39.75345185	-80.76681090
4,677.00	25.83	298.44	4,464.64	202.20	-1,042.39	14,437,061.43	1,705,921.66	39.75350399	-80.76693216
4,766.00	26.81	300.41	4,544.41	221.59	-1,076.75	14,437,080.83	1,705,887.30	39.75355750	-80.76705423
4,856.00	27.50	300.29	4,624.49	242.35	-1,112.20	14,437,101.58	1,705,851.85	39.75361475	-80.76718016
4,946.00	26.82	299.71	4,704.57	262.89	-1,147.78	14,437,122.12	1,705,816.27	39.75367142	-80.76730655
5,035.00	25.79	297.77	4,784.35	281.86	-1,182.35	14,437,141.10	1,705,781.70	39.75372377	-80.76742938
5,125.00	26.26	302.83	4,865.23	301.78	-1,216.41	14,437,161.02	1,705,747.64	39.75377872	-80.76755038
5,215.00	27.16	303.56	4,945.63	323.93	-1,250.25	14,437,183.17	1,705,713.80	39.75383979	-80.76767060
5,305.00	26.41	303.15	5,025.97	346.23	-1,284.13	14,437,205.47	1,705,679.92	39.75390127	-80.76779093
5,394.00	25.86	301.41	5,105.87	367.17	-1,317.27	14,437,226.41	1,705,646.78	39.75395902	-80.76790864
5,484.00	24.75	299.81	5,187.24	386.77	-1,350.37	14,437,246.00	1,705,613.68	39.75401307	-80.76802623
5,574.00	23.99	296.47	5,269.22	404.29	-1,383.09	14,437,263.52	1,705,580.96	39.75406142	-80.76814251
5,664.00	23.20	296.21	5,351.70	420.27	-1,415.38	14,437,279.51	1,705,548.67	39.75410555	-80.76825723
5,753.00	24.05	293.06	5,433.24	435.12	-1,447.79	14,437,294.36	1,705,516.26	39.75414655	-80.76837243
5,843.00	23.35	289.95	5,515.65	448.39	-1,481.43	14,437,307.62	1,705,482.62	39.75418323	-80.76849200
5,933.00	23.55	286.76	5,598.22	459.66	-1,515.42	14,437,318.90	1,705,448.63	39.75421443	-80.76861281
6,022.00	26.12	286.82	5,678.99	470.46	-1,551.20	14,437,329.69	1,705,412.85	39.75424433	-80.76874003
6,112.00	27.34	293.52	5,759.38	484.44	-1,589.12	14,437,343.68	1,705,374.92	39.75428301	-80.76887483
6,202.00	27.11	295.17	5,839.41	501.41	-1,626.63	14,437,360.65	1,705,337.41	39.75432988	-80.76900814
6,291.00	26.91	293.91	5,918.71	518.20	-1,663.40	14,437,377.43	1,705,300.65	39.75437624	-80.76913880
6,381.00	26.82	293.12	5,999.00	534.43	-1,700.69	14,437,393.66	1,705,263.36	39.75442107	-80.76927134
6,441.00	26.77	293.44	6,052.55	545.12	-1,725.54	14,437,404.35	1,705,238.51	39.75445060	-80.76935964
6,530.00	28.13	294.75	6,131.53	561.87	-1,762.98	14,437,421.11	1,705,201.07	39.75449689	-80.76949272
6,620.00	31.69	299.85	6,209.54	582.53	-1,802.77	14,437,441.77	1,705,161.28	39.75455390	-80.76963410
6,709.00	36.57	301.52	6,283.19	608.05	-1,845.68	14,437,467.28	1,705,118.37	39.75462427	-80.76978652
6,799.00	43.91	304.42	6,351.86	639.75	-1,894.35	14,437,498.98	1,705,069.70	39.75471168	-80.76995941

Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia
Site: Corley Pad
Well: Corley N-05HM (slot F)
Wellbore: Sidetrack 01
Design: Surveys Sidetrack 01

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well Corley N-05HM (slot F)
 RKB=1254+28 @ 1282.00usft (Precision 110)
 RKB=1254+28 @ 1282.00usft (Precision 110)
 Grid
 Minimum Curvature
 DB_Jul2216dt_v14

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 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
6,889.00	51.69	309.34	6,412.28	679.85	-1,947.50	14,437,539.08	1,705,016.55	39.75482218	-80.77014816
6,979.00	58.64	315.32	6,463.69	729.65	-2,001.93	14,437,588.88	1,704,962.12	39.75495932	-80.77034136
7,068.00	65.27	318.84	6,505.52	787.18	-2,055.32	14,437,646.41	1,704,908.73	39.75511769	-80.77053082
7,158.00	71.65	322.70	6,538.56	852.01	-2,108.18	14,437,711.25	1,704,855.87	39.75529612	-80.77071829
7,248.00	78.73	325.60	6,561.56	922.51	-2,159.07	14,437,781.74	1,704,804.98	39.75549007	-80.77089873
7,337.00	80.97	327.10	6,577.24	995.43	-2,207.61	14,437,854.66	1,704,756.44	39.75569068	-80.77107076
7,427.00	85.45	329.47	6,587.88	1,071.43	-2,254.56	14,437,930.67	1,704,709.49	39.75589974	-80.77123715
7,516.00	89.45	328.86	6,591.84	1,147.76	-2,300.13	14,438,006.99	1,704,663.92	39.75610967	-80.77139858
7,606.00	89.89	330.79	6,592.36	1,225.56	-2,345.36	14,438,084.79	1,704,618.69	39.75632365	-80.77155883
7,695.00	88.92	332.11	6,593.28	1,303.73	-2,387.89	14,438,162.96	1,704,576.15	39.75653863	-80.77170945
7,785.00	89.58	331.67	6,594.46	1,383.11	-2,430.30	14,438,242.34	1,704,533.75	39.75675692	-80.77185960
7,875.00	88.97	331.49	6,595.60	1,462.25	-2,473.13	14,438,321.49	1,704,490.92	39.75697457	-80.77201128
7,964.00	89.32	331.23	6,596.93	1,540.35	-2,515.78	14,438,399.59	1,704,448.27	39.75718936	-80.77216234
8,054.00	89.89	332.02	6,597.55	1,619.54	-2,558.55	14,438,478.77	1,704,405.50	39.75740712	-80.77231381
8,143.00	91.12	333.07	6,596.76	1,698.51	-2,599.58	14,438,557.74	1,704,364.47	39.75762429	-80.77245909
8,233.00	89.49	332.28	6,596.28	1,778.46	-2,640.89	14,438,637.70	1,704,323.16	39.75784415	-80.77260536
8,322.00	90.46	332.72	6,596.32	1,857.41	-2,681.99	14,438,716.64	1,704,282.06	39.75806123	-80.77275088
8,412.00	91.82	332.37	6,594.53	1,937.25	-2,723.47	14,438,796.49	1,704,240.58	39.75828080	-80.77289777
8,502.00	91.03	331.58	6,592.29	2,016.67	-2,765.74	14,438,875.91	1,704,198.30	39.75849921	-80.77304747
8,591.00	90.07	330.35	6,591.44	2,094.48	-2,808.94	14,438,953.72	1,704,155.11	39.75871319	-80.77320046
8,681.00	89.76	328.50	6,591.57	2,171.96	-2,854.71	14,439,031.20	1,704,109.33	39.75892630	-80.77336265
8,770.00	90.29	329.03	6,591.53	2,248.06	-2,900.86	14,439,107.30	1,704,063.18	39.75913561	-80.77352619
8,860.00	89.10	327.89	6,592.01	2,324.76	-2,947.94	14,439,184.00	1,704,016.11	39.75934658	-80.77369301
8,950.00	89.63	328.06	6,593.01	2,401.06	-2,995.66	14,439,260.30	1,703,968.39	39.75955645	-80.77386213
9,039.00	90.33	325.96	6,593.04	2,475.71	-3,044.12	14,439,334.94	1,703,919.93	39.75976178	-80.77403389
9,129.00	91.38	326.13	6,591.70	2,550.35	-3,094.38	14,439,409.59	1,703,869.67	39.75996713	-80.77421207
9,218.00	90.24	327.01	6,590.44	2,624.62	-3,143.41	14,439,483.85	1,703,820.64	39.76017142	-80.77438585
9,308.00	89.05	327.19	6,591.00	2,700.18	-3,192.29	14,439,559.42	1,703,771.76	39.76037928	-80.77455912
9,397.00	88.18	328.50	6,593.15	2,775.50	-3,239.64	14,439,634.74	1,703,724.40	39.76058647	-80.77472694
9,487.00	89.05	328.50	6,595.33	2,852.22	-3,286.65	14,439,711.45	1,703,677.39	39.76079747	-80.77489353
9,577.00	88.75	330.00	6,597.05	2,929.55	-3,332.66	14,439,788.78	1,703,631.39	39.76101016	-80.77505655
9,666.00	90.20	331.49	6,597.87	3,007.19	-3,376.15	14,439,866.42	1,703,587.90	39.76122368	-80.77521061
9,756.00	91.34	332.11	6,596.66	3,086.50	-3,418.68	14,439,945.73	1,703,545.37	39.76144178	-80.77536122
9,845.00	90.59	331.67	6,595.16	3,164.99	-3,460.60	14,440,024.22	1,703,503.45	39.76165762	-80.77550972
9,935.00	90.95	332.37	6,593.95	3,244.46	-3,502.82	14,440,103.70	1,703,461.22	39.76187617	-80.77565925
10,025.00	89.98	331.76	6,593.22	3,323.97	-3,544.98	14,440,183.20	1,703,419.06	39.76209481	-80.77580856
10,114.00	90.68	331.93	6,592.71	3,402.44	-3,586.98	14,440,261.67	1,703,377.07	39.76231059	-80.77595730
10,204.00	89.89	332.11	6,592.26	3,481.92	-3,629.20	14,440,341.15	1,703,334.85	39.76252915	-80.77610684
10,294.00	88.92	332.02	6,593.19	3,561.42	-3,671.36	14,440,420.66	1,703,292.69	39.76274779	-80.77625616
10,383.00	87.16	330.17	6,596.24	3,639.28	-3,714.35	14,440,498.52	1,703,249.70	39.76296192	-80.77640844
10,473.00	87.34	328.59	6,600.56	3,716.64	-3,760.14	14,440,575.88	1,703,203.91	39.76317468	-80.77657069
10,563.00	90.81	332.55	6,602.01	3,794.99	-3,804.34	14,440,654.23	1,703,159.71	39.76339015	-80.77672728
10,652.00	90.29	332.20	6,601.16	3,873.84	-3,845.60	14,440,733.08	1,703,118.45	39.76360698	-80.77688342
10,742.00	90.77	330.70	6,600.32	3,952.89	-3,888.61	14,440,812.13	1,703,075.44	39.76382437	-80.77702577
10,831.00	90.64	324.72	6,599.23	4,028.09	-3,936.13	14,440,887.32	1,703,027.92	39.76403120	-80.77719421
10,921.00	91.08	319.45	6,597.88	4,099.06	-3,991.41	14,440,958.29	1,702,972.64	39.76422649	-80.77739029
11,011.00	90.24	314.35	6,596.84	4,164.75	-4,052.88	14,441,023.98	1,702,911.17	39.76440730	-80.77760845
11,101.00	90.67	313.83	6,596.12	4,227.37	-4,117.52	14,441,086.60	1,702,846.53	39.76457971	-80.77783792
11,190.00	97.45	320.51	6,589.82	4,292.38	-4,177.82	14,441,151.62	1,702,786.23	39.76475868	-80.77805193
11,280.00	92.57	330.26	6,581.94	4,366.07	-4,228.65	14,441,225.31	1,702,735.40	39.76496139	-80.77823215
11,370.00	89.58	332.11	6,580.25	4,444.90	-4,272.01	14,441,304.14	1,702,692.04	39.76517818	-80.77838577
11,460.00	90.20	332.11	6,580.43	4,524.45	-4,314.11	14,441,383.68	1,702,649.94	39.76539692	-80.77853489
11,549.00	89.85	332.72	6,580.39	4,603.33	-4,355.32	14,441,462.56	1,702,608.73	39.76561383	-80.77868085
11,639.00	89.10	332.72	6,581.21	4,683.32	-4,396.57	14,441,542.55	1,702,567.48	39.76583378	-80.77882694
11,729.00	90.15	332.64	6,581.80	4,763.27	-4,437.88	14,441,622.51	1,702,526.17	39.76605365	-80.77897322

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Corley N-05HM (slot F)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Site:	Corley Pad	MD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Well:	Corley N-05HM (slot F)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	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
11,818.00	90.99	332.90	6,580.92	4,842.41	-4,478.60	14,441,701.64	1,702,485.45	39.76627124	-80.77911744
11,908.00	90.73	332.90	6,579.57	4,922.52	-4,519.59	14,441,781.75	1,702,444.46	39.76649152	-80.77926262
11,998.00	92.00	332.90	6,577.42	5,002.61	-4,560.58	14,441,861.85	1,702,403.47	39.76671176	-80.77940778
12,087.00	90.99	333.51	6,575.10	5,082.03	-4,600.69	14,441,941.26	1,702,363.36	39.76693013	-80.77954981
12,177.00	90.77	332.28	6,573.72	5,162.13	-4,641.69	14,442,021.37	1,702,322.36	39.76715040	-80.77969502
12,267.00	89.54	330.70	6,573.47	5,241.21	-4,684.64	14,442,100.45	1,702,279.41	39.76736787	-80.77984719
12,356.00	90.73	330.17	6,573.26	5,318.62	-4,728.55	14,442,177.86	1,702,235.49	39.76758075	-80.78000278
12,446.00	89.85	328.86	6,572.81	5,396.18	-4,774.21	14,442,255.41	1,702,189.84	39.76779405	-80.78016458
12,536.00	89.49	328.68	6,573.33	5,473.14	-4,820.87	14,442,332.37	1,702,143.18	39.76800571	-80.78032997
12,625.00	90.24	327.98	6,573.54	5,548.88	-4,867.60	14,442,408.11	1,702,096.45	39.76821404	-80.78049560
12,715.00	89.27	328.42	6,573.92	5,625.37	-4,915.02	14,442,484.60	1,702,049.03	39.76842442	-80.78066370
12,804.00	90.37	328.33	6,574.20	5,701.15	-4,961.69	14,442,560.39	1,702,002.36	39.76863285	-80.78082912
12,894.00	89.89	329.21	6,574.00	5,778.11	-5,008.35	14,442,637.34	1,701,955.70	39.76884451	-80.78099451
12,983.00	89.49	330.70	6,574.48	5,855.15	-5,052.91	14,442,714.38	1,701,911.14	39.76905638	-80.78115241
13,073.00	90.33	330.70	6,574.62	5,933.63	-5,096.96	14,442,792.87	1,701,867.09	39.76927222	-80.78130848
13,163.00	91.69	331.40	6,573.03	6,012.37	-5,140.51	14,442,871.60	1,701,823.54	39.76948875	-80.78146280
13,252.00	91.16	331.32	6,570.82	6,090.46	-5,183.16	14,442,949.69	1,701,780.89	39.76970348	-80.78161389
13,342.00	91.12	330.35	6,569.03	6,169.03	-5,227.01	14,443,028.26	1,701,737.04	39.76991956	-80.78176926
13,431.00	90.68	329.91	6,567.63	6,246.20	-5,271.33	14,443,105.43	1,701,692.72	39.77013178	-80.78192632
13,521.00	89.85	331.05	6,567.22	6,324.51	-5,315.67	14,443,183.75	1,701,648.38	39.77034715	-80.78208345
13,611.00	88.66	331.40	6,568.39	6,403.39	-5,358.99	14,443,262.62	1,701,605.06	39.77056406	-80.78223694
13,700.00	89.67	331.58	6,569.68	6,481.59	-5,401.46	14,443,340.82	1,701,562.58	39.77077910	-80.78238743
13,790.00	90.68	332.11	6,569.41	6,560.94	-5,443.93	14,443,420.17	1,701,520.12	39.77099730	-80.78253787
13,879.00	89.93	331.23	6,568.93	6,639.27	-5,486.16	14,443,498.51	1,701,477.88	39.77121272	-80.78268750
13,969.00	90.64	330.44	6,568.49	6,717.86	-5,530.02	14,443,577.10	1,701,434.03	39.77142883	-80.78284291
14,058.00	89.80	328.94	6,568.14	6,794.69	-5,574.94	14,443,653.93	1,701,389.11	39.77164013	-80.78300209
14,148.00	90.90	330.26	6,567.59	6,872.31	-5,620.48	14,443,731.55	1,701,343.57	39.77185360	-80.78316350
14,237.00	89.93	329.73	6,566.95	6,949.38	-5,664.98	14,443,808.62	1,701,299.07	39.77206555	-80.78332123
14,327.00	91.16	330.53	6,566.09	7,027.42	-5,709.80	14,443,886.66	1,701,254.25	39.77228017	-80.78348007
14,416.00	90.20	329.30	6,565.04	7,104.42	-5,754.41	14,443,963.66	1,701,209.64	39.77249193	-80.78363817
14,506.00	90.37	329.03	6,564.59	7,181.70	-5,800.54	14,444,040.94	1,701,163.51	39.77270446	-80.78380168
14,595.00	90.07	328.06	6,564.25	7,257.62	-5,846.98	14,444,116.86	1,701,117.06	39.77291327	-80.78396632
14,685.00	91.21	327.89	6,563.24	7,333.92	-5,894.71	14,444,193.15	1,701,069.34	39.77312312	-80.78413550
14,774.00	89.67	327.45	6,562.56	7,409.12	-5,942.30	14,444,268.35	1,701,021.75	39.77332995	-80.78430425
14,864.00	90.24	326.83	6,562.63	7,484.72	-5,991.13	14,444,343.95	1,700,972.92	39.77353789	-80.78447739
14,954.00	90.77	326.75	6,561.84	7,560.01	-6,040.42	14,444,419.25	1,700,923.62	39.77374500	-80.78465218
15,043.00	91.65	327.19	6,559.96	7,634.61	-6,088.92	14,444,493.85	1,700,875.12	39.77395019	-80.78482416
15,133.00	91.38	327.89	6,557.58	7,710.52	-6,137.21	14,444,569.76	1,700,826.84	39.77415899	-80.78499536
15,222.00	91.25	328.24	6,555.54	7,786.03	-6,184.28	14,444,645.27	1,700,779.77	39.77436667	-80.78516223
15,312.00	90.81	329.38	6,553.92	7,863.01	-6,230.88	14,444,722.25	1,700,733.17	39.77457838	-80.78532742
15,401.00	90.64	329.65	6,552.79	7,939.70	-6,276.02	14,444,798.94	1,700,688.02	39.77478929	-80.78548745
15,491.00	89.36	330.26	6,552.79	8,017.61	-6,321.08	14,444,876.84	1,700,642.96	39.77500353	-80.78564716
15,580.00	88.92	330.88	6,554.13	8,095.11	-6,364.81	14,444,954.35	1,700,599.24	39.77521667	-80.78580213
15,670.00	89.76	330.97	6,555.16	8,173.77	-6,408.54	14,445,033.00	1,700,555.51	39.77543296	-80.78595711
15,760.00	89.05	331.23	6,556.10	8,252.55	-6,452.04	14,445,111.79	1,700,512.01	39.77564962	-80.78611123
15,849.00	90.07	330.70	6,556.78	8,330.36	-6,495.23	14,445,189.60	1,700,468.82	39.77586359	-80.78626430
15,939.00	90.81	331.05	6,556.09	8,408.98	-6,539.03	14,445,268.22	1,700,425.02	39.77607978	-80.78641954
16,029.00	92.22	330.79	6,553.71	8,487.61	-6,582.76	14,445,346.84	1,700,381.29	39.77629600	-80.78657450
16,118.00	91.60	331.49	6,550.75	8,565.51	-6,625.69	14,445,424.74	1,700,338.36	39.77651022	-80.78672664
16,208.00	90.90	331.67	6,548.78	8,644.64	-6,668.51	14,445,503.88	1,700,295.53	39.77672782	-80.78687839
16,297.00	90.02	330.35	6,548.07	8,722.49	-6,711.65	14,445,581.72	1,700,252.40	39.77694189	-80.78703124
16,387.00	88.84	330.26	6,548.96	8,800.66	-6,756.23	14,445,659.90	1,700,207.82	39.77715687	-80.78718926
16,477.00	89.71	330.00	6,550.10	8,878.70	-6,801.05	14,445,737.93	1,700,163.00	39.77737147	-80.78734812
16,566.00	90.51	329.30	6,549.93	8,955.50	-6,846.02	14,445,814.73	1,700,118.03	39.77758269	-80.78750753
16,656.00	90.37	328.77	6,549.24	9,032.67	-6,892.32	14,445,891.91	1,700,071.73	39.77779492	-80.78767168

WV Department of Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Corley N-05HM (slot F)
Project:	Marshall County, West Virginia	TVD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Site:	Corley Pad	MD Reference:	RKB=1254+28 @ 1282.00usft (Precision 110)
Well:	Corley N-05HM (slot F)	North Reference:	Grid
Wellbore:	Sidetrack 01	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 01	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	
16,722.00	90.95	328.42	6,548.48	9,089.00	-6,926.71	14,445,948.23	1,700,037.34	39.77794983	-80.78779361	
Survey @ 16722.00 MD 6548.48 TVD										
16,769.00	90.95	328.42	6,547.70	9,129.03	-6,951.32	14,445,988.27	1,700,012.73	39.77805994	-80.78788086	
Survey projected to 16769.00 MD 6547.70 TVD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
3,475.00	3,378.11	26.55	-564.07	Tie into original hole @ 3475 MD	
16,722.00	6,548.48	9,089.00	-6,926.71	Survey @ 16722.00 MD 6548.48 TVD	
16,769.00	6,547.70	9,129.03	-6,951.32	Survey projected to 16769.00 MD 6547.70 TVD	

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