



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Weller 5 HM (B)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B28)
Site:	Lily/Weller	MD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B28)
Well:	Weller 5 HM (B)	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:	0.12 °

Well	Weller 5 HM (B)					
Well Position	+N/-S	0.00 usft	Northing:	14,431,181.14 usft	Latitude:	39.73742745
	+E/-W	0.00 usft	Easting:	1,694,835.22 usft	Longitude:	-80.80642285
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	12/16/2017	-8.62	66.89	52,102.10074437

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	155.74

Survey Program	Date	2/28/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
157.00	2,686.00	MWD surf (Original Hole)	MWD	MWD - Standard	
2,779.00	13,400.00	MWD (Original Hole)	MWD	MWD - Standard	
13,449.00	13,449.00	Projection (Original Hole)	MWD	MWD - Standard	

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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
0.00	0.00	0.00	0.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285
157.00	0.45	258.49	157.00	-0.12	-0.60	14,431,181.02	1,694,834.61	39.73742712	-80.80642500
MWD surveys									
187.00	0.45	340.01	187.00	-0.04	-0.76	14,431,181.10	1,694,834.46	39.73742736	-80.80642555
217.00	0.46	349.66	217.00	0.19	-0.82	14,431,181.33	1,694,834.40	39.73742799	-80.80642577
248.00	0.57	1.02	248.00	0.47	-0.84	14,431,181.61	1,694,834.38	39.73742875	-80.80642584
278.00	0.16	9.52	277.99	0.66	-0.83	14,431,181.80	1,694,834.39	39.73742927	-80.80642580
308.00	0.47	80.88	307.99	0.72	-0.70	14,431,181.86	1,694,834.52	39.73742944	-80.80642535
339.00	0.53	35.89	338.99	0.86	-0.49	14,431,182.00	1,694,834.72	39.73742981	-80.80642460
369.00	0.14	274.47	368.99	0.97	-0.45	14,431,182.11	1,694,834.77	39.73743013	-80.80642444



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Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
400.00	0.49	62.14	399.99	1.04	-0.37	14,431,182.18	1,694,834.85	39.73743030	-80.80642416
430.00	0.13	128.93	429.99	1.08	-0.23	14,431,182.22	1,694,834.99	39.73743041	-80.80642366
460.00	0.36	10.66	459.99	1.15	-0.19	14,431,182.29	1,694,835.03	39.73743060	-80.80642350
491.00	0.50	17.78	490.99	1.37	-0.13	14,431,182.51	1,694,835.09	39.73743122	-80.80642329
521.00	0.35	75.93	520.99	1.52	0.00	14,431,182.66	1,694,835.22	39.73743162	-80.80642283
551.00	0.39	39.69	550.99	1.62	0.16	14,431,182.76	1,694,835.37	39.73743190	-80.80642228
581.00	0.57	64.07	580.99	1.76	0.36	14,431,182.90	1,694,835.57	39.73743229	-80.80642157
611.00	0.36	95.21	610.99	1.82	0.58	14,431,182.96	1,694,835.80	39.73743245	-80.80642076
641.00	0.23	324.19	640.99	1.86	0.64	14,431,183.00	1,694,835.86	39.73743256	-80.80642055
672.00	0.36	41.38	671.99	1.98	0.67	14,431,183.12	1,694,835.89	39.73743290	-80.80642045
702.00	0.41	80.88	701.99	2.07	0.84	14,431,183.21	1,694,836.06	39.73743314	-80.80641985
733.00	0.21	149.65	732.99	2.04	0.98	14,431,183.18	1,694,836.20	39.73743305	-80.80641936
764.00	0.32	12.76	763.99	2.08	1.02	14,431,183.22	1,694,836.24	39.73743315	-80.80641919
795.00	0.26	35.16	794.99	2.22	1.08	14,431,183.36	1,694,836.30	39.73743354	-80.80641898
826.00	0.32	127.54	825.99	2.22	1.19	14,431,183.36	1,694,836.41	39.73743355	-80.80641859
857.00	0.50	97.13	856.98	2.15	1.40	14,431,183.29	1,694,836.61	39.73743336	-80.80641787
889.00	0.29	227.80	888.98	2.08	1.48	14,431,183.22	1,694,836.69	39.73743316	-80.80641759
920.00	0.35	47.81	919.98	2.09	1.49	14,431,183.23	1,694,836.71	39.73743319	-80.80641754
952.00	0.27	112.30	951.98	2.13	1.63	14,431,183.27	1,694,836.85	39.73743329	-80.80641704
979.00	0.41	56.86	978.98	2.16	1.77	14,431,183.30	1,694,836.99	39.73743337	-80.80641654
1,081.00	0.64	39.96	1,080.98	2.79	2.44	14,431,183.93	1,694,837.66	39.73743511	-80.80641415
1,176.00	0.75	9.61	1,175.97	3.81	2.89	14,431,184.95	1,694,838.10	39.73743791	-80.80641256
1,270.00	0.65	197.02	1,269.97	3.91	2.83	14,431,185.05	1,694,838.05	39.73743817	-80.80641275
1,365.00	0.90	190.43	1,364.96	2.66	2.54	14,431,183.80	1,694,837.76	39.73743475	-80.80641380
1,459.00	1.96	208.15	1,458.93	0.52	1.65	14,431,181.66	1,694,836.87	39.73742886	-80.80641699
1,553.00	3.08	201.70	1,552.84	-3.25	-0.05	14,431,177.89	1,694,835.17	39.73741854	-80.80642304
1,648.00	4.35	198.05	1,647.64	-9.04	-2.11	14,431,172.10	1,694,833.11	39.73740263	-80.80643041
1,742.00	6.63	206.49	1,741.20	-17.29	-5.63	14,431,163.85	1,694,829.59	39.73738000	-80.80644301
1,837.00	9.13	210.21	1,835.30	-28.71	-11.87	14,431,152.43	1,694,823.35	39.73734866	-80.80646530
1,931.00	11.61	208.50	1,927.76	-43.47	-20.14	14,431,137.67	1,694,815.08	39.73730818	-80.80649482
2,025.00	13.18	201.21	2,019.57	-61.78	-28.53	14,431,119.36	1,694,806.69	39.73725796	-80.80652481
2,119.00	14.25	191.18	2,110.90	-83.12	-34.65	14,431,098.02	1,694,800.57	39.73719938	-80.80654675
2,214.00	15.40	178.26	2,202.76	-107.21	-36.54	14,431,073.93	1,694,798.68	39.73713324	-80.80655364
2,309.00	16.51	173.38	2,294.10	-133.23	-34.60	14,431,047.91	1,694,800.62	39.73706177	-80.80654694
2,404.00	15.88	176.27	2,385.33	-159.61	-32.19	14,431,021.53	1,694,803.02	39.73698931	-80.80653860
2,498.00	17.28	180.25	2,475.43	-186.40	-31.42	14,430,994.74	1,694,803.80	39.73691572	-80.80653604
2,591.00	18.81	178.91	2,563.85	-215.21	-31.19	14,430,965.93	1,694,804.03	39.73683661	-80.80653546
2,686.00	20.54	173.97	2,653.31	-247.10	-29.15	14,430,934.04	1,694,806.07	39.73674902	-80.80652844
2,779.00	21.26	172.40	2,740.19	-280.04	-25.21	14,430,901.10	1,694,810.01	39.73665854	-80.80651467
2,874.00	28.47	170.23	2,826.33	-319.48	-19.08	14,430,861.66	1,694,816.14	39.73655019	-80.80649317
2,968.00	30.97	166.48	2,907.96	-365.08	-9.62	14,430,816.06	1,694,825.60	39.73642488	-80.80645987
3,062.00	31.63	167.00	2,988.28	-412.62	1.58	14,430,768.52	1,694,836.80	39.73629427	-80.80642040
3,157.00	33.04	167.03	3,068.55	-462.13	13.00	14,430,719.01	1,694,848.21	39.73615823	-80.80638017
3,251.00	31.40	164.99	3,148.07	-510.76	25.09	14,430,670.38	1,694,860.31	39.73602461	-80.80633753
3,349.00	30.41	167.72	3,232.16	-559.65	36.98	14,430,621.49	1,694,872.20	39.73589025	-80.80629561
3,443.00	31.26	168.39	3,312.87	-606.79	46.95	14,430,574.35	1,694,882.17	39.73576074	-80.80626052
3,537.00	32.72	167.68	3,392.60	-655.50	57.28	14,430,525.64	1,694,892.50	39.73562690	-80.80622415
3,631.00	33.24	169.67	3,471.45	-705.67	67.32	14,430,475.47	1,694,902.54	39.73548906	-80.80618882
3,726.00	34.69	166.48	3,550.25	-757.58	78.31	14,430,423.56	1,694,913.53	39.73534645	-80.80615012
3,820.00	33.34	169.50	3,628.17	-808.99	89.27	14,430,372.15	1,694,924.49	39.73520518	-80.80611153
3,915.00	33.32	167.77	3,707.54	-860.16	99.56	14,430,320.98	1,694,934.77	39.73506459	-80.80607534
4,010.00	31.27	168.16	3,787.84	-909.80	110.14	14,430,271.34	1,694,945.36	39.73492821	-80.80603806
4,105.00	31.45	169.30	3,868.97	-958.28	119.80	14,430,222.86	1,694,955.02	39.73479500	-80.80600407
4,199.00	32.94	169.51	3,948.51	-1,007.51	129.01	14,430,173.63	1,694,964.23	39.73465975	-80.80597170
4,294.00	33.33	168.41	4,028.06	-1,058.48	138.96	14,430,122.66	1,694,974.17	39.73451973	-80.80593671

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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
4,389.00	33.24	168.73	4,107.48	-1,109.58	149.29	14,430,071.56	1,694,984.51	39.73437932	-80.80590036
4,483.00	33.07	168.17	4,186.17	-1,159.95	159.58	14,430,021.19	1,694,994.80	39.73424094	-80.80586413
4,578.00	32.72	167.61	4,265.94	-1,210.39	170.40	14,429,970.75	1,695,005.62	39.73410233	-80.80582602
4,673.00	31.61	168.12	4,346.36	-1,259.84	181.04	14,429,921.30	1,695,016.26	39.73396649	-80.80578858
4,767.00	32.47	168.71	4,426.04	-1,308.69	191.05	14,429,872.45	1,695,026.27	39.73383227	-80.80575334
4,862.00	32.30	167.17	4,506.27	-1,358.44	201.68	14,429,822.70	1,695,036.90	39.73369556	-80.80571592
4,956.00	31.47	162.21	4,586.10	-1,406.30	214.75	14,429,774.84	1,695,049.97	39.73356404	-80.80566978
5,050.00	32.14	163.85	4,665.98	-1,453.68	229.21	14,429,727.46	1,695,064.42	39.73343383	-80.80561874
5,145.00	31.32	168.70	4,746.80	-1,502.18	241.08	14,429,678.96	1,695,076.29	39.73330058	-80.80557690
5,240.00	32.92	169.19	4,827.25	-1,551.75	250.76	14,429,629.39	1,695,085.97	39.73316438	-80.80554285
5,335.00	32.03	164.98	4,907.41	-1,601.45	262.13	14,429,579.69	1,695,097.35	39.73302784	-80.80550278
5,429.00	31.17	169.43	4,987.48	-1,649.44	273.05	14,429,531.70	1,695,108.27	39.73289596	-80.80546429
5,523.00	33.24	171.80	5,067.02	-1,698.86	281.19	14,429,482.28	1,695,116.41	39.73276019	-80.80543573
5,617.00	33.12	169.15	5,145.70	-1,749.59	289.70	14,429,431.55	1,695,124.92	39.73262083	-80.80540585
5,712.00	31.76	165.70	5,225.88	-1,799.31	300.76	14,429,381.83	1,695,135.98	39.73248421	-80.80536689
5,806.00	31.29	169.80	5,306.01	-1,847.31	311.20	14,429,333.83	1,695,146.41	39.73235232	-80.80533015
5,900.00	33.23	169.59	5,385.50	-1,896.68	320.17	14,429,284.46	1,695,155.39	39.73221670	-80.80529860
5,995.00	31.97	166.30	5,465.54	-1,946.72	330.83	14,429,234.42	1,695,166.05	39.73207921	-80.80526106
6,090.00	33.30	164.86	5,545.54	-1,996.33	343.60	14,429,184.81	1,695,178.82	39.73194288	-80.80521603
6,185.00	33.49	168.36	5,624.86	-2,047.18	355.70	14,429,133.96	1,695,190.92	39.73180316	-80.80517338
6,280.00	33.15	165.71	5,704.25	-2,098.02	367.40	14,429,083.12	1,695,202.62	39.73166346	-80.80513216
6,375.00	33.35	167.71	5,783.70	-2,148.71	379.37	14,429,032.43	1,695,214.59	39.73152418	-80.80508998
6,470.00	34.04	165.39	5,862.74	-2,199.96	391.64	14,428,981.18	1,695,226.86	39.73138337	-80.80504674
6,564.00	33.99	166.70	5,940.66	-2,250.99	404.32	14,428,930.15	1,695,239.54	39.73124315	-80.80500203
6,657.00	32.43	171.02	6,018.48	-2,300.93	414.20	14,428,880.21	1,695,249.41	39.73110594	-80.80496730
6,709.00	32.73	169.86	6,062.29	-2,328.54	418.85	14,428,852.60	1,695,254.06	39.73103009	-80.80495097
6,781.00	33.14	169.67	6,122.72	-2,367.06	425.80	14,428,814.08	1,695,261.02	39.73092425	-80.80492652
6,833.00	34.29	170.37	6,165.97	-2,395.49	430.80	14,428,785.65	1,695,266.02	39.73084616	-80.80490896
6,876.00	38.55	168.26	6,200.57	-2,420.56	435.56	14,428,760.58	1,695,270.78	39.73077727	-80.80489224
6,923.00	43.82	166.50	6,235.93	-2,450.74	442.34	14,428,730.40	1,695,277.56	39.73069434	-80.80486835
6,970.00	47.78	163.25	6,268.69	-2,483.25	451.16	14,428,697.89	1,695,286.38	39.73060502	-80.80483724
7,017.00	52.00	161.14	6,298.97	-2,517.45	462.17	14,428,663.69	1,695,297.38	39.73051101	-80.80479835
7,065.00	54.99	159.30	6,327.52	-2,553.75	475.23	14,428,627.39	1,695,310.45	39.73041125	-80.80475216
7,112.00	56.40	157.19	6,354.01	-2,589.80	489.63	14,428,591.34	1,695,324.84	39.73031216	-80.80470124
7,159.00	59.21	155.78	6,379.05	-2,626.26	505.50	14,428,554.88	1,695,340.72	39.73021193	-80.80464506
7,206.00	61.10	155.61	6,402.44	-2,663.41	522.28	14,428,517.73	1,695,357.50	39.73010980	-80.80458567
7,255.00	63.21	153.67	6,425.33	-2,702.56	540.84	14,428,478.58	1,695,376.06	39.73000219	-80.80451996
7,302.00	66.95	152.35	6,445.13	-2,740.53	560.19	14,428,440.61	1,695,395.40	39.72989779	-80.80445144
7,349.00	69.85	152.27	6,462.43	-2,779.22	580.49	14,428,401.92	1,695,415.71	39.72979141	-80.80437952
7,396.00	72.48	152.97	6,477.60	-2,818.72	600.94	14,428,362.42	1,695,436.16	39.72968282	-80.80430708
7,444.00	74.07	152.97	6,491.42	-2,859.66	621.84	14,428,321.48	1,695,457.05	39.72957024	-80.80423309
7,491.00	76.22	152.18	6,503.47	-2,899.98	642.76	14,428,281.16	1,695,477.98	39.72945938	-80.80415899
7,538.00	80.18	150.60	6,513.08	-2,940.36	664.79	14,428,240.78	1,695,500.01	39.72934836	-80.80408095
7,585.00	84.31	148.66	6,519.42	-2,980.53	688.33	14,428,200.61	1,695,523.55	39.72923791	-80.80399753
7,633.00	87.38	149.89	6,522.89	-3,021.68	712.79	14,428,159.46	1,695,548.00	39.72912476	-80.80391087
7,727.00	89.85	149.01	6,525.17	-3,102.60	760.55	14,428,078.54	1,695,595.77	39.72890224	-80.80374162
7,821.00	90.33	148.66	6,525.02	-3,183.03	809.19	14,427,998.11	1,695,644.41	39.72868105	-80.80356923
7,915.00	90.68	149.28	6,524.19	-3,263.57	857.65	14,427,917.57	1,695,692.86	39.72845956	-80.80339752
8,010.00	89.10	148.57	6,524.37	-3,344.94	906.68	14,427,836.20	1,695,741.90	39.72823581	-80.80322376
8,104.00	89.45	148.22	6,525.56	-3,424.99	955.94	14,427,756.15	1,695,791.15	39.72801567	-80.80304919
8,199.00	89.10	150.24	6,526.76	-3,506.60	1,004.53	14,427,674.53	1,695,839.75	39.72779123	-80.80287699
8,293.00	90.29	150.24	6,527.26	-3,588.20	1,051.19	14,427,592.94	1,695,886.41	39.72756685	-80.80271169
8,388.00	88.75	150.33	6,528.06	-3,670.71	1,098.28	14,427,510.43	1,695,933.49	39.72733999	-80.80254486
8,482.00	89.63	150.86	6,529.39	-3,752.59	1,144.42	14,427,428.55	1,695,979.64	39.72711484	-80.80238137
8,576.00	90.55	151.04	6,529.24	-3,834.76	1,190.07	14,427,346.38	1,696,025.28	39.72688889	-80.80221968

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Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Weller 5 HM (B)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B28)
Site:	Lily/Weller	MD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B28)
Well:	Weller 5 HM (B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,671.00	90.55	147.96	6,528.33	-3,916.60	1,238.27	14,427,264.54	1,696,073.49	39.72666384	-80.80204887
8,765.00	88.35	147.52	6,529.23	-3,996.08	1,288.44	14,427,185.06	1,696,123.66	39.72644526	-80.80187106
8,859.00	88.66	147.34	6,531.68	-4,075.27	1,339.03	14,427,105.87	1,696,174.25	39.72622747	-80.80169177
8,954.00	87.34	149.10	6,535.00	-4,155.98	1,389.03	14,427,025.16	1,696,224.25	39.72600553	-80.80151458
9,049.00	88.26	151.21	6,538.65	-4,238.31	1,436.27	14,426,942.83	1,696,271.48	39.72577913	-80.80134722
9,143.00	92.53	153.58	6,538.00	-4,321.58	1,479.81	14,426,859.56	1,696,315.03	39.72555017	-80.80119301
9,238.00	90.95	152.00	6,535.11	-4,406.03	1,523.23	14,426,775.11	1,696,358.44	39.72531800	-80.80103926
9,333.00	89.41	151.56	6,534.82	-4,489.73	1,568.15	14,426,691.41	1,696,403.36	39.72508785	-80.80088017
9,427.00	89.80	151.56	6,535.46	-4,572.38	1,612.91	14,426,608.76	1,696,448.13	39.72486059	-80.80072161
9,522.00	89.19	149.72	6,536.30	-4,655.17	1,659.49	14,426,525.97	1,696,494.70	39.72463293	-80.80055662
9,617.00	89.98	149.45	6,536.99	-4,737.10	1,707.58	14,426,444.04	1,696,542.80	39.72440765	-80.80038623
9,713.00	90.99	149.45	6,536.18	-4,819.77	1,756.37	14,426,361.37	1,696,591.59	39.72418032	-80.80021335
9,808.00	89.63	150.60	6,535.66	-4,902.06	1,803.83	14,426,279.08	1,696,639.05	39.72395404	-80.80004521
9,902.00	89.45	148.57	6,536.42	-4,983.11	1,851.42	14,426,198.03	1,696,686.64	39.72373114	-80.79987662
9,998.00	89.89	148.22	6,536.97	-5,064.87	1,901.73	14,426,116.27	1,696,736.94	39.72350629	-80.79969835
10,093.00	89.63	149.28	6,537.37	-5,146.09	1,951.01	14,426,035.05	1,696,786.23	39.72328295	-80.79952372
10,188.00	90.77	149.45	6,537.04	-5,227.83	1,999.42	14,425,953.31	1,696,834.63	39.72305817	-80.79935221
10,283.00	89.88	149.80	6,536.50	-5,309.78	2,047.45	14,425,871.36	1,696,882.67	39.72283279	-80.79918203
10,377.00	90.90	149.54	6,535.86	-5,390.92	2,094.92	14,425,790.22	1,696,930.14	39.72260969	-80.79901387
10,473.00	89.54	149.98	6,535.49	-5,473.85	2,143.26	14,425,707.29	1,696,978.48	39.72238163	-80.79884259
10,568.00	89.49	150.07	6,536.29	-5,556.14	2,190.73	14,425,625.00	1,697,025.95	39.72215534	-80.79867445
10,662.00	89.45	149.98	6,537.16	-5,637.56	2,237.69	14,425,543.58	1,697,072.91	39.72193144	-80.79850808
10,757.00	89.19	149.80	6,538.29	-5,719.74	2,285.34	14,425,461.40	1,697,120.56	39.72170547	-80.79833927
10,851.00	88.57	149.19	6,540.13	-5,800.71	2,333.05	14,425,380.43	1,697,168.27	39.72148280	-80.79817025
10,946.00	88.88	150.16	6,542.24	-5,882.69	2,381.00	14,425,298.45	1,697,216.22	39.72125736	-80.79800037
11,041.00	89.63	150.16	6,543.48	-5,965.09	2,428.27	14,425,216.05	1,697,263.49	39.72103078	-80.79783294
11,136.00	90.11	150.33	6,543.69	-6,047.56	2,475.42	14,425,133.58	1,697,310.64	39.72080398	-80.79766593
11,229.00	90.90	150.60	6,542.87	-6,128.47	2,521.26	14,425,052.67	1,697,356.48	39.72058149	-80.79750355
11,324.00	89.85	151.56	6,542.25	-6,211.62	2,567.20	14,424,969.52	1,697,402.42	39.72035285	-80.79734084
11,419.00	90.55	152.09	6,541.92	-6,295.37	2,612.05	14,424,885.77	1,697,447.27	39.72012259	-80.79718200
11,514.00	90.24	149.72	6,541.26	-6,378.37	2,658.24	14,424,802.77	1,697,493.46	39.71989435	-80.79701840
11,608.00	89.71	149.98	6,541.31	-6,459.65	2,705.46	14,424,721.49	1,697,540.67	39.71967083	-80.79685116
11,703.00	90.02	150.51	6,541.53	-6,542.13	2,752.60	14,424,639.01	1,697,587.82	39.71944404	-80.79668415
11,797.00	89.27	148.93	6,542.11	-6,623.30	2,800.00	14,424,557.84	1,697,635.22	39.71922082	-80.79651626
11,892.00	89.80	151.91	6,542.88	-6,705.90	2,846.89	14,424,475.24	1,697,682.10	39.71899367	-80.79635018
11,987.00	90.15	150.16	6,542.92	-6,789.02	2,892.89	14,424,392.12	1,697,728.11	39.71876512	-80.79618725
12,082.00	89.32	149.72	6,543.36	-6,871.24	2,940.48	14,424,309.90	1,697,775.69	39.71853902	-80.79601870
12,176.00	88.53	149.80	6,545.13	-6,952.43	2,987.81	14,424,228.71	1,697,823.03	39.71831574	-80.79585103
12,270.00	89.80	150.42	6,546.50	-7,033.92	3,034.65	14,424,147.22	1,697,869.86	39.71809167	-80.79568513
12,365.00	89.01	150.07	6,547.48	-7,116.39	3,081.79	14,424,064.75	1,697,917.01	39.71786488	-80.79551814
12,460.00	88.48	149.72	6,549.56	-7,198.55	3,129.43	14,423,982.59	1,697,964.65	39.71763893	-80.79534940
12,555.00	88.97	150.33	6,551.68	-7,280.82	3,176.88	14,423,900.32	1,698,012.10	39.71741269	-80.79518132
12,650.00	88.53	147.87	6,553.75	-7,362.31	3,225.65	14,423,818.82	1,698,060.87	39.71718859	-80.79500855
12,745.00	89.49	147.78	6,555.39	-7,442.71	3,276.23	14,423,738.43	1,698,111.45	39.71696747	-80.79482933
12,840.00	90.81	147.34	6,555.14	-7,522.89	3,327.19	14,423,658.25	1,698,162.41	39.71674697	-80.79464877
12,935.00	90.46	149.45	6,554.09	-7,603.79	3,376.97	14,423,577.35	1,698,212.19	39.71652448	-80.79447241
13,029.00	89.41	150.24	6,554.20	-7,685.06	3,424.19	14,423,496.08	1,698,259.41	39.71630097	-80.79430516
13,123.00	88.53	151.12	6,555.89	-7,767.01	3,470.21	14,423,414.13	1,698,305.43	39.71607564	-80.79414217
13,219.00	88.04	150.68	6,558.76	-7,850.85	3,516.88	14,423,330.29	1,698,352.10	39.71584508	-80.79397690
13,313.00	88.88	151.39	6,561.29	-7,933.06	3,562.38	14,423,248.08	1,698,397.60	39.71561902	-80.79381576
13,400.00	89.49	153.50	6,562.52	-8,010.18	3,602.62	14,423,170.96	1,698,437.84	39.71540697	-80.79367329
Survey @ 13400.00 MD 6562.52 TVD									
13,449.00	89.49	153.50	6,562.96	-8,054.03	3,624.48	14,423,127.11	1,698,459.70	39.71528641	-80.79359591
Survey projected to 13449.00 MD 6562.96 TVD									

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Weller 5 HM (B)
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Site:	Lily/Weller	MD Reference:	RKB=1273+26 @ 1299.00usft (Nabors B28)
Well:	Weller 5 HM (B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
157.00	157.00	-0.12	-0.60	MWD surveys
13,400.00	6,562.52	-8,010.18	3,602.62	Survey @ 13400.00 MD 6562.52 TVD
13,449.00	6,562.96	-8,054.03	3,624.48	Survey projected to 13449.00 MD 6562.96 TVD

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