

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-04 HM (slot F)
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 2-04 HM (slot F)	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	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 2-04 HM (slot F)					
Well Position	+N/-S	0.00 usft	Northing:	14,457,681.67 usft	Latitude:	39.81001220
	+E/-W	0.00 usft	Easting:	1,721,027.98 usft	Longitude:	-80.71294900
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,331.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/20/2018	-8.72	66.89	52,068.91391783

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	155.00	

Survey Program	Date 6/27/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	915.00	Gyro (Original Hole)	NS-GYRO-MS	North sensing gyrocompassing ms
951.00	6,058.00	MWD2 (Original Hole)	MWD	MWD - Standard
6,124.00	15,865.00	MWD Lat (Original Hole)	MWD	MWD - Standard
15,915.00	15,915.00	Projection (Original Hole)		

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Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.41	273.96	100.00	0.02	-0.36	-0.17	0.41	0.41	0.00	
Gyro										
200.00	0.38	307.02	200.00	0.25	-0.98	-0.64	0.23	-0.03	33.06	
300.00	0.26	313.63	300.00	0.61	-1.41	-1.14	0.13	-0.12	6.61	
400.00	0.34	301.82	399.99	0.92	-1.82	-1.60	0.10	0.08	-11.81	
500.00	0.28	314.24	499.99	1.25	-2.25	-2.08	0.09	-0.06	12.42	
600.00	0.23	334.23	599.99	1.60	-2.51	-2.51	0.10	-0.05	19.99	

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700.00	0.28	336.04	699.99	2.00	-2.70	-2.95	0.05	0.05	1.81	
800.00	0.29	346.33	799.99	2.47	-2.86	-3.45	0.05	0.01	10.29	
900.00	0.18	326.02	899.99	2.85	-3.01	-3.85	0.14	-0.11	-20.31	
915.00	0.22	276.01	914.99	2.87	-3.05	-3.89	1.15	0.27	-333.40	
951.00	0.63	324.80	950.99	3.04	-3.23	-4.12	1.42	1.14	135.53	
MWD surveys										
982.00	0.24	315.50	981.99	3.22	-3.37	-4.35	1.27	-1.26	-30.00	
1,014.00	0.21	335.26	1,013.99	3.32	-3.45	-4.47	0.26	-0.09	61.75	
1,046.00	0.07	64.25	1,045.99	3.39	-3.45	-4.53	0.69	-0.44	278.09	
1,077.00	0.16	305.73	1,076.99	3.42	-3.47	-4.57	0.65	0.29	-382.32	
1,108.00	0.22	324.65	1,107.99	3.49	-3.54	-4.66	0.28	0.19	61.03	
1,140.00	0.08	28.46	1,139.99	3.56	-3.57	-4.74	0.62	-0.44	199.41	
1,171.00	0.05	168.25	1,170.99	3.57	-3.55	-4.74	0.40	-0.10	450.94	
1,199.00	0.21	66.71	1,198.99	3.58	-3.50	-4.72	0.80	0.57	-362.64	
1,294.00	0.49	113.74	1,293.98	3.48	-2.97	-4.41	0.40	0.29	49.51	
1,388.00	1.45	124.22	1,387.97	2.65	-1.62	-3.09	1.03	1.02	11.15	
1,483.00	1.98	118.53	1,482.93	1.19	0.82	-0.74	0.59	0.56	-5.99	
1,578.00	2.40	107.83	1,577.86	-0.20	4.15	1.94	0.62	0.44	-11.26	
1,672.00	2.75	107.80	1,671.76	-1.49	8.17	4.81	0.37	0.37	-0.03	
1,767.00	2.01	115.16	1,766.68	-2.90	11.85	7.63	0.84	-0.78	7.75	
1,862.00	0.98	119.86	1,861.65	-4.01	14.06	9.58	1.09	-1.08	4.95	
1,956.00	1.57	122.25	1,955.62	-5.10	15.85	11.32	0.63	0.63	2.54	
2,051.00	2.88	129.66	2,050.55	-7.32	18.79	14.57	1.41	1.38	7.80	
2,145.00	3.66	122.66	2,144.40	-10.44	23.13	19.24	0.93	0.83	-7.45	
2,240.00	3.04	116.00	2,239.23	-13.18	27.95	23.76	0.77	-0.65	-7.01	
2,335.00	1.74	107.08	2,334.15	-14.71	31.59	26.68	1.42	-1.37	-9.39	
2,429.00	0.85	108.94	2,428.12	-15.36	33.61	28.12	0.95	-0.95	1.98	
2,524.00	0.14	160.64	2,523.12	-15.69	34.32	28.73	0.81	-0.75	54.42	
2,618.00	0.30	232.23	2,617.12	-15.95	34.16	28.90	0.31	0.17	76.16	
2,713.00	0.88	248.02	2,712.11	-16.38	33.29	28.91	0.63	0.61	16.62	
2,795.00	1.33	268.63	2,794.10	-16.64	31.75	28.50	0.72	0.55	25.13	
2,894.00	1.65	268.36	2,893.07	-16.71	29.18	27.47	0.32	0.32	-0.27	
2,988.00	1.96	271.65	2,987.02	-16.70	26.22	26.22	0.35	0.33	3.50	
3,083.00	1.62	263.41	3,081.97	-16.81	23.26	25.06	0.45	-0.36	-8.67	
3,178.00	0.57	188.39	3,176.96	-17.43	21.86	25.03	1.65	-1.11	-78.97	
3,273.00	0.89	157.56	3,271.95	-18.58	22.07	26.16	0.52	0.34	-32.45	
3,367.00	0.90	151.36	3,365.94	-19.90	22.71	27.63	0.10	0.01	-6.60	
3,462.00	1.18	130.50	3,460.92	-21.19	23.81	29.27	0.49	0.29	-21.96	
3,557.00	0.45	102.97	3,555.91	-21.91	24.91	30.39	0.85	-0.77	-28.98	
3,651.00	0.66	36.31	3,649.91	-21.56	25.59	30.35	0.68	0.22	-70.91	
3,749.00	0.79	31.03	3,747.90	-20.52	26.28	29.70	0.15	0.13	-5.39	
3,846.00	0.94	38.26	3,844.89	-19.32	27.11	28.97	0.19	0.15	7.45	
3,938.00	1.66	35.67	3,936.87	-17.65	28.36	27.98	0.79	0.78	-2.82	
4,032.00	0.92	23.11	4,030.84	-15.85	29.45	26.81	0.84	-0.79	-13.36	

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4,127.00	0.13	127.28	4,125.84	-15.21	29.83	26.40	1.01	-0.83	109.65
4,222.00	0.68	195.65	4,220.84	-15.82	29.77	26.92	0.68	0.58	71.97
4,316.00	1.18	205.86	4,314.82	-17.23	29.20	27.95	0.56	0.53	10.86
4,411.00	1.11	147.11	4,409.81	-18.88	29.27	29.48	1.18	-0.07	-61.84
4,505.00	1.50	110.79	4,503.78	-20.08	30.91	31.27	0.95	0.41	-38.64
4,600.00	1.22	56.83	4,598.76	-19.97	32.92	32.01	1.33	-0.29	-56.80
4,694.00	1.42	355.94	4,692.74	-18.26	33.68	30.78	1.43	0.21	-64.78
4,789.00	1.43	331.33	4,787.71	-16.05	33.03	28.50	0.64	0.01	-25.91
4,884.00	1.49	255.52	4,882.69	-15.32	31.26	27.09	1.89	0.06	-79.80
4,979.00	2.80	243.73	4,977.62	-16.65	27.98	26.92	1.45	1.38	-12.41
5,074.00	7.64	273.03	5,072.21	-17.35	19.59	24.00	5.66	5.09	30.84
5,168.00	10.85	275.61	5,164.98	-16.15	4.54	16.56	3.44	3.41	2.74
5,263.00	15.47	287.73	5,257.48	-11.41	-16.44	3.40	5.64	4.86	12.76
5,358.00	19.06	287.43	5,348.18	-2.91	-43.32	-15.67	3.78	3.78	-0.32
5,452.00	24.32	285.53	5,435.50	6.88	-76.63	-38.62	5.64	5.60	-2.02
5,547.00	28.91	281.24	5,520.41	16.60	-118.03	-64.93	5.24	4.83	-4.52
5,642.00	33.93	278.87	5,601.46	25.17	-166.78	-93.30	5.44	5.28	-2.49
5,736.00	36.94	276.29	5,678.05	32.31	-220.79	-122.60	3.58	3.20	-2.74
5,831.00	37.17	272.89	5,753.87	36.89	-277.84	-150.85	2.17	0.24	-3.58
5,926.00	34.74	270.09	5,830.77	38.38	-333.58	-175.76	3.09	-2.56	-2.95
6,020.00	34.29	271.23	5,908.22	38.99	-386.84	-198.82	0.84	-0.48	1.21
6,058.00	33.87	271.54	5,939.70	39.50	-408.12	-208.28	1.20	-1.11	0.82
6,124.00	32.35	270.77	5,994.98	40.23	-444.17	-224.18	2.39	-2.30	-1.17
6,219.00	29.67	258.99	6,076.47	36.08	-492.71	-240.93	6.97	-2.82	-12.40
6,250.00	28.66	250.90	6,103.55	32.18	-507.28	-243.55	13.12	-3.26	-26.10
6,282.00	27.52	244.05	6,131.79	26.43	-521.18	-244.22	10.68	-3.56	-21.41
6,314.00	27.69	238.86	6,160.15	19.35	-534.19	-243.30	7.53	0.53	-16.22
6,345.00	27.78	232.71	6,187.59	11.25	-546.11	-240.99	9.23	0.29	-19.84
6,377.00	28.40	227.53	6,215.83	1.59	-557.66	-237.12	7.86	1.94	-16.19
6,408.00	28.62	222.16	6,243.07	-8.89	-568.08	-232.02	8.30	0.71	-17.32
6,440.00	28.57	220.41	6,271.17	-20.40	-578.18	-225.86	2.62	-0.16	-5.47
6,472.00	28.40	218.65	6,299.30	-32.17	-587.90	-219.30	2.68	-0.53	-5.50
6,503.00	28.57	213.64	6,326.55	-44.10	-596.61	-212.17	7.73	0.55	-16.16
6,535.00	29.14	208.45	6,354.58	-57.32	-604.56	-203.55	8.02	1.78	-16.22
6,566.00	30.55	205.29	6,381.47	-71.08	-611.52	-194.02	6.81	4.55	-10.19
6,598.00	31.21	201.69	6,408.94	-86.14	-618.06	-183.13	6.13	2.06	-11.25
6,630.00	32.44	197.91	6,436.13	-102.02	-623.77	-171.16	7.32	3.84	-11.81
6,661.00	34.07	193.78	6,462.05	-118.36	-628.39	-158.30	9.00	5.26	-13.32
6,693.00	36.53	191.05	6,488.17	-136.42	-632.35	-143.61	9.13	7.69	-8.53
6,724.00	38.02	188.41	6,512.84	-154.92	-635.52	-128.17	7.05	4.81	-8.52
6,756.00	40.04	185.69	6,537.70	-174.92	-637.98	-111.09	8.28	6.31	-8.50
6,787.00	42.42	182.70	6,561.01	-195.29	-639.46	-93.26	9.97	7.68	-9.65
6,819.00	45.01	179.54	6,584.14	-217.39	-639.88	-73.40	10.58	8.09	-9.88

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6,850.00	47.38	176.99	6,605.60	-239.75	-639.19	-52.85	9.68	7.65	-8.23
6,882.00	48.79	174.70	6,626.98	-263.49	-637.46	-30.60	6.91	4.41	-7.16
6,914.00	50.55	172.15	6,647.69	-287.72	-634.66	-7.46	8.19	5.50	-7.97
6,946.00	52.53	169.96	6,667.59	-312.47	-630.76	16.62	8.18	6.19	-6.84
6,977.00	55.47	168.38	6,685.81	-337.10	-626.04	40.94	10.34	9.48	-5.10
7,009.00	56.53	166.35	6,703.71	-362.98	-620.24	66.85	6.22	3.31	-6.34
7,040.00	59.74	164.68	6,720.07	-388.47	-613.65	92.73	11.32	10.35	-5.39
7,072.00	62.07	162.93	6,735.63	-415.31	-605.84	120.36	8.71	7.28	-5.47
7,103.00	65.19	161.17	6,749.40	-441.73	-597.28	147.92	11.28	10.06	-5.68
7,135.00	67.52	159.59	6,762.23	-469.34	-587.44	177.10	8.57	7.28	-4.94
7,167.00	69.85	158.53	6,773.87	-497.18	-576.78	206.84	7.91	7.28	-3.31
7,198.00	72.04	158.09	6,783.99	-524.40	-565.95	236.09	7.19	7.06	-1.42
7,230.00	74.24	157.56	6,793.27	-552.76	-554.39	266.67	7.06	6.88	-1.66
7,261.00	76.48	156.33	6,801.10	-580.35	-542.65	296.65	8.18	7.23	-3.97
7,293.00	77.58	155.02	6,808.28	-608.77	-529.80	327.83	5.27	3.44	-4.09
7,324.00	78.37	153.17	6,814.74	-636.04	-516.55	358.14	6.37	2.55	-5.97
7,356.00	80.31	153.43	6,820.66	-664.13	-502.43	389.57	6.11	6.06	0.81
7,387.00	81.93	153.35	6,825.45	-691.51	-488.71	420.19	5.23	5.23	-0.26
7,419.00	83.60	152.73	6,829.48	-719.81	-474.31	451.91	5.56	5.22	-1.94
7,449.00	85.98	152.03	6,832.20	-746.28	-460.46	481.76	8.27	7.93	-2.33
7,481.00	87.78	151.32	6,833.94	-774.40	-445.30	513.65	6.05	5.63	-2.22
7,544.00	88.66	150.80	6,835.90	-829.51	-414.83	576.47	1.62	1.40	-0.83
7,638.00	87.60	151.68	6,838.97	-911.87	-369.63	670.22	1.47	-1.13	0.94
7,733.00	87.87	151.59	6,842.72	-995.40	-324.53	764.98	0.30	0.28	-0.09
7,827.00	87.60	151.41	6,846.44	-1,077.94	-279.72	858.73	0.35	-0.29	-0.19
7,922.00	87.96	150.62	6,850.12	-1,160.98	-233.72	953.43	0.91	0.38	-0.83
8,017.00	89.63	150.27	6,852.11	-1,243.60	-186.87	1,048.11	1.80	1.76	-0.37
8,111.00	90.07	148.78	6,852.36	-1,324.61	-139.20	1,141.67	1.65	0.47	-1.59
8,206.00	89.63	148.34	6,852.61	-1,405.66	-89.64	1,236.07	0.66	-0.46	-0.46
8,301.00	87.60	146.58	6,854.90	-1,485.71	-38.57	1,330.22	2.83	-2.14	-1.85
8,396.00	89.98	148.07	6,856.91	-1,565.65	12.71	1,424.33	2.96	2.51	1.57
8,491.00	88.53	147.37	6,858.15	-1,645.96	63.43	1,518.56	1.69	-1.53	-0.74
8,586.00	89.32	147.28	6,859.93	-1,725.91	114.71	1,612.69	0.84	0.83	-0.09
8,680.00	89.54	148.16	6,860.86	-1,805.38	164.91	1,705.93	0.96	0.23	0.94
8,775.00	89.45	149.92	6,861.70	-1,886.84	213.78	1,800.41	1.85	-0.09	1.85
8,869.00	89.36	150.53	6,862.68	-1,968.43	260.46	1,894.07	0.66	-0.10	0.65
8,964.00	90.24	150.53	6,863.01	-2,051.13	307.19	1,988.78	0.93	0.93	0.00
9,058.00	90.51	150.18	6,862.39	-2,132.83	353.69	2,082.47	0.47	0.29	-0.37
9,153.00	89.54	147.11	6,862.35	-2,213.94	403.11	2,176.88	3.39	-1.02	-3.23
9,247.00	89.80	148.34	6,862.89	-2,293.42	453.30	2,270.12	1.34	0.28	1.31
9,342.00	91.21	148.51	6,862.06	-2,374.35	503.04	2,364.48	1.49	1.48	0.18
9,437.00	89.41	151.76	6,861.54	-2,456.72	550.34	2,459.12	3.91	-1.89	3.42
9,532.00	89.32	151.50	6,862.59	-2,540.30	595.48	2,553.95	0.29	-0.09	-0.27

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-04 HM (slot F)
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 2-04 HM (slot F)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,626.00	89.01	151.15	6,863.96	-2,622.76	640.58	2,647.75	0.50	-0.33	-0.37
9,721.00	89.45	151.94	6,865.24	-2,706.28	685.84	2,742.57	0.95	0.46	0.83
9,815.00	88.62	149.83	6,866.82	-2,788.38	731.57	2,836.31	2.41	-0.88	-2.24
9,910.00	89.71	151.06	6,868.21	-2,871.01	778.42	2,930.99	1.73	1.15	1.29
10,004.00	90.42	151.41	6,868.10	-2,953.41	823.65	3,024.79	0.84	0.76	0.37
10,099.00	91.60	152.03	6,866.43	-3,037.06	868.66	3,119.62	1.40	1.24	0.65
10,193.00	89.93	152.82	6,865.17	-3,120.37	912.16	3,213.51	1.97	-1.78	0.84
10,288.00	89.41	151.06	6,865.72	-3,204.20	956.85	3,308.37	1.93	-0.55	-1.85
10,382.00	90.46	152.12	6,865.83	-3,286.87	1,001.57	3,402.20	1.59	1.12	1.13
10,476.00	89.32	150.71	6,866.01	-3,369.41	1,046.54	3,496.01	1.93	-1.21	-1.50
10,570.00	90.20	153.26	6,866.40	-3,452.39	1,090.69	3,589.87	2.87	0.94	2.71
10,665.00	90.46	150.71	6,865.85	-3,536.25	1,135.31	3,684.73	2.70	0.27	-2.68
10,760.00	89.67	151.15	6,865.75	-3,619.28	1,181.47	3,779.49	0.95	-0.83	0.46
10,854.00	90.11	150.18	6,865.93	-3,701.23	1,227.52	3,873.22	1.13	0.47	-1.03
10,948.00	88.92	150.62	6,866.72	-3,782.95	1,273.94	3,966.91	1.35	-1.27	0.47
11,043.00	89.01	150.27	6,868.44	-3,865.58	1,320.80	4,061.60	0.38	0.09	-0.37
11,137.00	88.13	150.80	6,870.78	-3,947.39	1,367.02	4,155.28	1.09	-0.94	0.56
11,232.00	88.35	150.62	6,873.70	-4,030.21	1,413.47	4,249.97	0.30	0.23	-0.19
11,327.00	89.14	148.42	6,875.78	-4,112.06	1,461.65	4,344.51	2.46	0.83	-2.32
11,422.00	89.85	148.16	6,876.62	-4,192.87	1,511.58	4,438.85	0.80	0.75	-0.27
11,516.00	89.23	147.72	6,877.37	-4,272.53	1,561.47	4,532.13	0.81	-0.66	-0.47
11,611.00	89.76	148.69	6,878.21	-4,353.27	1,611.52	4,626.46	1.16	0.56	1.02
11,705.00	89.45	149.57	6,878.86	-4,433.95	1,659.75	4,719.97	0.99	-0.33	0.94
11,800.00	90.02	150.01	6,879.30	-4,516.05	1,707.55	4,814.57	0.76	0.60	0.46
11,895.00	89.58	149.65	6,879.63	-4,598.18	1,755.30	4,909.18	0.60	-0.46	-0.38
11,989.00	89.80	150.45	6,880.14	-4,679.62	1,802.22	5,002.83	0.88	0.23	0.85
12,084.00	89.19	149.83	6,880.98	-4,762.01	1,849.52	5,097.49	0.92	-0.64	-0.65
12,179.00	90.68	150.97	6,881.08	-4,844.61	1,896.44	5,192.18	1.97	1.57	1.20
12,273.00	92.09	150.45	6,878.81	-4,926.56	1,942.42	5,285.88	1.60	1.50	-0.55
12,368.00	92.22	150.27	6,875.24	-5,009.07	1,989.37	5,380.50	0.23	0.14	-0.19
12,463.00	90.90	149.22	6,872.65	-5,091.10	2,037.21	5,475.07	1.78	-1.39	-1.11
12,557.00	89.27	148.25	6,872.51	-5,171.44	2,085.99	5,568.50	2.02	-1.73	-1.03
12,652.00	91.08	149.39	6,872.22	-5,252.72	2,135.18	5,662.94	2.25	1.91	1.20
12,747.00	90.15	149.57	6,871.20	-5,334.55	2,183.42	5,757.50	1.00	-0.98	0.19
12,841.00	90.07	150.01	6,871.02	-5,415.78	2,230.72	5,851.11	0.48	-0.09	0.47
12,936.00	88.70	149.65	6,872.04	-5,497.91	2,278.46	5,945.71	1.49	-1.44	-0.38
13,030.00	88.44	149.30	6,874.39	-5,578.85	2,326.18	6,039.25	0.46	-0.28	-0.37
13,125.00	88.92	149.57	6,876.58	-5,660.63	2,374.48	6,133.77	0.58	0.51	0.28
13,220.00	90.68	148.86	6,876.91	-5,742.24	2,423.10	6,228.28	2.00	1.85	-0.75
13,314.00	90.99	148.69	6,875.54	-5,822.62	2,471.82	6,321.72	0.38	0.33	-0.18
13,409.00	90.20	147.90	6,874.55	-5,903.43	2,521.75	6,416.06	1.18	-0.83	-0.83
13,504.00	90.42	148.90	6,874.04	-5,984.34	2,571.53	6,510.43	1.08	0.23	1.05
13,598.00	90.15	147.19	6,873.57	-6,064.10	2,621.27	6,603.73	1.84	-0.29	-1.82
13,693.00	90.29	149.48	6,873.21	-6,144.95	2,671.14	6,698.09	2.42	0.15	2.41

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Heaven Hill 2-04 HM (slot F)
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 2-04 HM (slot F)	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,787.00	90.68	150.45	6,872.41	-6,226.32	2,718.19	6,791.72	1.11	0.41	1.03
13,882.00	91.08	150.80	6,870.95	-6,309.10	2,764.78	6,886.43	0.56	0.42	0.37
13,977.00	90.11	151.50	6,869.97	-6,392.30	2,810.62	6,981.21	1.26	-1.02	0.74
14,072.00	90.07	151.76	6,869.82	-6,475.89	2,855.76	7,076.04	0.28	-0.04	0.27
14,166.00	90.02	152.38	6,869.74	-6,558.94	2,899.79	7,169.92	0.66	-0.05	0.66
14,261.00	89.14	151.24	6,870.44	-6,642.67	2,944.66	7,264.77	1.52	-0.93	-1.20
14,355.00	88.79	150.89	6,872.14	-6,724.92	2,990.13	7,358.53	0.53	-0.37	-0.37
14,449.00	89.80	151.15	6,873.29	-6,807.14	3,035.67	7,452.30	1.11	1.07	0.28
14,544.00	89.98	150.45	6,873.48	-6,890.07	3,082.02	7,547.04	0.76	0.19	-0.74
14,639.00	90.46	149.65	6,873.11	-6,972.38	3,129.45	7,641.68	0.98	0.51	-0.84
14,733.00	90.99	149.22	6,871.92	-7,053.31	3,177.24	7,735.23	0.73	0.56	-0.46
14,828.00	89.36	146.23	6,871.63	-7,133.62	3,227.96	7,829.45	3.58	-1.72	-3.15
14,922.00	90.02	147.63	6,872.14	-7,212.39	3,279.25	7,922.52	1.65	0.70	1.49
15,017.00	90.11	148.51	6,872.03	-7,293.02	3,329.50	8,016.82	0.93	0.09	0.93
15,112.00	89.14	148.16	6,872.65	-7,373.87	3,379.36	8,111.18	1.09	-1.02	-0.37
15,205.00	89.80	150.36	6,873.51	-7,453.80	3,426.90	8,203.70	2.47	0.71	2.37
15,299.00	89.80	149.92	6,873.84	-7,535.32	3,473.70	8,297.36	0.47	0.00	-0.47
15,393.00	91.65	151.41	6,872.65	-7,617.25	3,519.74	8,391.08	2.53	1.97	1.59
15,488.00	89.76	148.25	6,871.48	-7,699.36	3,567.47	8,485.67	3.88	-1.99	-3.33
15,582.00	90.29	149.92	6,871.44	-7,780.00	3,615.77	8,579.17	1.86	0.56	1.78
15,677.00	91.03	151.50	6,870.35	-7,862.85	3,662.24	8,673.89	1.84	0.78	1.66
15,771.00	91.34	151.41	6,868.40	-7,945.41	3,707.15	8,767.69	0.34	0.33	-0.10
15,865.00	91.96	151.06	6,865.70	-8,027.77	3,752.36	8,861.45	0.76	0.66	-0.37
Survey @ 15865.00 MD 6865.70 TVD									
15,915.00	91.96	151.06	6,863.99	-8,071.50	3,776.54	8,911.30	0.00	0.00	0.00
Survey projected to 15915.00 MD 6863.99 TVD									

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Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
100.00	100.00	0.02	-0.36	Gyro
951.00	950.99	3.04	-3.23	MWD surveys
15,865.00	6,865.70	-8,027.77	3,752.36	Survey @ 15865.00 MD 6865.70 TVD