



Survey Report



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

Local Co-ordinate Reference: Well Ten High 1N-18HM (S)
TVD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
MD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Jul2216dft_v14

Project: Marshall County, West Virginia.
Map System: Universal Transverse Mercator (US Survey Feet)
Geo Datum: NAD83 West Virginia - HARN
Map Zone: Zone 17N (84 W to 78 W)
System Datum: Mean Sea Level

Site: Ten High
Site Position: Northing: 14,456,545.60 usft Latitude: 39.80681659
From: Lat/Long Easting: 1,730,001.41 usft Longitude: -80.68101011
Position Uncertainty: Slot Radius: 0.00 usft Grid Convergence: 0.20 °

Well: Ten High 1N-18HM (S)
Well Position +N/-S 0.00 usft Northing: 14,456,548.38 usft Latitude: 39.80681659
+E/-W 0.00 usft Easting: 1,729,989.23 usft Longitude: -80.68105346
Position Uncertainty 0.00 usft Wellhead Elevation: usft Ground Level: 1,310.00 usft

Wellbore Original Hole

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/1/2018	-8.75	66.87	52,041.11138479

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	339.38

Survey Program	From (usft)	To (usft)	Date	Survey (Wellbore)	Tool Name	Description
	189.00	1,112.00	11/27/2018	MWD 17 1/2 (Original Hole)	MWD	MWD - Standard
	1,165.00	6,188.00		MWD 8 3/4 (Original Hole)	MWD	MWD - Standard
	6,267.00	17,925.00		MWD (Original Hole)	MWD	MWD - Standard
	17,985.00	17,985.00		Projection (Original Hole)	MWD	MWD - Standard

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
	189.00	0.40	160.01	189.00	-0.62	0.23	-0.66	0.21	0.21	0.00
MWD surveys										
	220.00	0.57	206.31	220.00	-0.86	0.19	-0.87	1.33	0.55	149.35
	252.00	0.50	122.40	252.00	-1.08	0.24	-1.09	2.24	-0.22	-282.22
	284.00	0.07	216.53	284.00	-1.17	0.35	-1.22	1.59	-1.34	294.16
	315.00	0.69	194.07	315.00	-1.36	0.29	-1.38	2.02	2.00	-72.45
	347.00	0.28	237.90	346.99	-1.59	0.18	-1.55	1.64	-1.28	136.97



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Survey Calculation Method:

Database:

Well Ten High 1N-18HM (S)

RKB=1310+33 @ 1343.00usft (Nabors X08)

RKB=1310+33 @ 1343.00usft (Nabors X08)

Grid

Minimum Curvature

DB_Jul2216dt_v14

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)
371.00	0.21	197.07	370.99	-1.67	0.12	-1.60	0.76	-0.29	-170.13
406.00	0.46	199.08	405.99	-1.86	0.05	-1.76	0.71	0.71	5.74
434.00	0.60	147.69	433.99	-2.09	0.09	-1.99	1.70	0.50	-183.54
466.00	0.23	202.38	465.99	-2.29	0.16	-2.20	1.57	-1.16	170.91
498.00	0.35	158.71	497.99	-2.44	0.17	-2.34	0.76	0.38	-136.47
529.00	0.23	186.48	528.99	-2.59	0.20	-2.49	0.59	-0.39	89.58
561.00	0.29	213.49	560.99	-2.72	0.14	-2.60	0.42	0.19	84.41
592.00	0.59	216.60	591.99	-2.92	0.01	-2.73	0.97	0.97	10.03
624.00	0.50	224.26	623.99	-3.15	-0.19	-2.88	0.36	-0.28	23.94
655.00	0.48	259.83	654.99	-3.27	-0.41	-2.91	0.97	-0.06	114.74
687.00	0.45	230.84	686.99	-3.37	-0.64	-2.93	0.73	-0.09	-90.59
718.00	0.36	180.95	717.99	-3.55	-0.74	-3.06	1.13	-0.29	-160.94
750.00	0.39	183.55	749.98	-3.76	-0.75	-3.25	0.11	0.09	8.13
781.00	0.71	184.97	780.98	-4.05	-0.77	-3.52	1.03	1.03	4.58
813.00	0.58	191.57	812.98	-4.41	-0.82	-3.84	0.47	-0.41	20.63
844.00	0.44	219.53	843.98	-4.65	-0.93	-4.03	0.91	-0.45	90.19
876.00	0.46	206.45	875.98	-4.86	-1.06	-4.18	0.33	0.06	-40.88
908.00	0.35	201.35	907.98	-5.07	-1.15	-4.34	0.36	-0.34	-15.94
939.00	0.30	217.88	938.98	-5.22	-1.24	-4.45	0.34	-0.16	53.32
968.00	0.34	236.22	957.98	-5.29	-1.32	-4.49	0.58	0.21	96.53
970.00	0.32	200.34	969.98	-5.34	-1.36	-4.52	1.70	-0.17	-299.00
1,002.00	0.33	229.33	1,001.98	-5.49	-1.46	-4.62	0.51	0.03	90.59
1,034.00	0.49	218.98	1,033.98	-5.65	-1.61	-4.72	0.55	0.50	-32.34
1,065.00	0.65	185.40	1,064.97	-5.93	-1.71	-4.95	1.17	0.52	-108.32
1,097.00	0.66	219.51	1,096.97	-6.25	-1.85	-5.20	1.20	0.03	106.59
1,112.00	0.57	219.62	1,111.97	-6.38	-1.95	-5.28	0.60	-0.60	0.73
1,165.00	0.63	232.61	1,164.97	-6.76	-2.35	-5.50	0.28	0.11	24.51
1,260.00	0.55	242.16	1,259.96	-7.29	-3.17	-5.71	0.13	-0.08	10.05
1,354.00	0.68	296.20	1,353.96	-7.25	-4.07	-5.36	0.61	0.14	57.49
1,449.00	1.50	345.40	1,448.94	-5.80	-4.89	-3.71	1.24	0.86	51.79
1,544.00	2.92	356.88	1,543.87	-2.18	-5.33	-0.16	1.56	1.49	12.08
1,638.00	3.59	4.39	1,637.72	3.14	-5.24	4.79	0.84	0.71	7.99
1,733.00	4.66	14.05	1,732.47	9.85	-4.07	10.66	1.34	1.13	10.17
1,828.00	5.17	24.29	1,827.12	17.50	-1.38	16.86	1.07	0.54	10.78
1,923.00	5.91	33.43	1,921.68	25.48	3.08	22.76	1.21	0.78	9.62
2,018.00	6.18	43.31	2,016.16	33.28	9.28	27.88	1.13	0.28	10.40
2,113.00	6.20	45.26	2,110.60	40.62	16.43	32.23	0.22	0.02	2.05
2,207.00	6.64	47.85	2,204.01	47.84	24.07	36.30	0.56	0.47	2.76
2,302.00	6.86	50.86	2,298.35	55.10	32.54	40.11	0.44	0.23	3.17
2,397.00	6.56	53.14	2,392.70	61.94	41.28	43.43	0.42	-0.32	2.40
2,492.00	4.81	60.51	2,487.23	67.16	49.09	45.57	1.99	-1.84	7.76
2,586.00	4.10	62.88	2,580.95	70.63	55.51	46.55	0.78	-0.76	2.52
2,681.00	4.29	60.36	2,675.69	73.93	61.62	47.49	0.28	0.20	-2.65



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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)
2,752.00	4.40	58.06	2,746.49	76.69	66.24	48.45	0.29	0.15	-3.24
2,876.00	4.87	58.09	2,870.08	81.99	74.75	50.41	0.38	0.38	0.02
2,970.00	5.08	58.44	2,963.73	86.27	81.68	51.98	0.23	0.22	0.37
3,065.00	4.77	59.12	3,058.38	90.50	88.66	53.48	0.33	-0.33	0.72
3,159.00	4.54	55.73	3,152.07	94.60	95.08	55.06	0.38	-0.24	-3.61
3,254.00	3.93	53.75	3,246.81	98.65	100.82	56.82	0.66	-0.64	-2.08
3,348.00	4.58	46.52	3,340.55	103.13	106.14	59.15	0.90	0.69	-7.69
3,443.00	4.23	41.08	3,435.27	108.38	111.19	62.28	0.57	-0.37	-5.73
3,537.00	5.90	40.69	3,528.90	114.66	116.62	66.24	1.78	1.78	-0.41
3,632.00	7.88	43.80	3,623.21	123.06	124.31	71.40	2.12	2.08	3.27
3,726.00	9.06	48.53	3,716.18	132.62	134.32	76.82	1.46	1.26	5.03
3,820.00	9.66	57.86	3,808.94	141.71	146.54	81.03	1.73	0.64	9.93
3,914.00	10.61	63.84	3,901.47	149.72	160.99	83.44	1.51	1.01	6.36
4,009.00	11.54	73.00	3,994.71	156.36	177.93	83.68	2.09	0.98	9.64
4,103.00	13.99	74.34	4,086.38	162.18	197.86	82.11	2.63	2.61	1.43
4,198.00	15.37	78.57	4,178.28	167.77	221.26	79.10	1.84	1.45	4.45
4,293.00	17.04	86.51	4,269.51	171.11	247.50	72.99	2.92	1.76	8.36
4,387.00	20.48	87.91	4,358.51	172.55	277.69	63.70	3.69	3.66	1.49
4,482.00	22.81	84.76	4,446.80	174.84	312.64	53.54	2.74	2.45	-3.32
4,576.00	25.13	81.90	4,532.69	179.32	350.55	44.38	2.76	2.47	-3.04
4,671.00	27.86	82.20	4,617.71	185.17	392.53	35.08	2.88	2.87	0.32
4,766.00	29.75	77.68	4,700.96	193.22	437.55	26.75	3.03	1.99	-4.76
4,860.00	29.37	75.94	4,782.73	203.79	482.70	20.75	1.00	-0.40	-1.85
4,955.00	30.06	74.29	4,865.24	215.90	528.21	16.05	1.13	0.73	-1.74
5,049.00	31.73	76.42	4,945.90	228.08	574.90	11.00	2.12	1.78	2.27
5,144.00	30.32	84.48	5,027.34	236.25	623.07	1.69	4.61	-1.48	8.48
5,239.00	30.70	83.44	5,109.19	241.33	671.04	-10.45	0.68	0.40	-1.09
5,333.00	32.05	82.92	5,189.44	247.15	719.63	-22.12	1.46	1.44	-0.55
5,428.00	29.72	78.74	5,270.97	254.85	767.75	-31.85	3.33	-2.45	-4.40
5,522.00	30.38	75.73	5,352.34	265.26	813.64	-38.27	1.75	0.70	-3.20
5,620.00	31.00	77.43	5,436.62	276.86	862.29	-44.54	1.09	0.63	1.73
5,715.00	31.65	81.41	5,517.78	285.91	910.82	-53.17	2.28	0.68	4.19
5,809.00	30.68	82.61	5,598.21	292.68	958.99	-63.80	1.23	-1.03	1.28
5,904.00	30.25	82.37	5,680.10	298.97	1,006.74	-74.72	0.47	-0.45	-0.25
5,998.00	30.00	81.91	5,761.40	305.43	1,053.47	-85.14	0.36	-0.27	-0.49
6,093.00	29.37	80.78	5,843.93	312.50	1,099.98	-94.90	0.89	-0.66	-1.19
6,188.00	29.40	79.65	5,926.71	320.42	1,145.92	-103.66	0.58	0.03	-1.19
6,267.00	28.78	78.59	5,995.75	327.67	1,183.64	-110.16	1.02	-0.78	-1.34
6,305.00	29.32	78.94	6,028.97	331.26	1,201.73	-113.17	1.49	1.42	0.92
6,400.00	28.00	75.95	6,112.33	341.14	1,246.20	-119.59	2.05	-1.39	-3.15
6,494.00	26.20	54.16	6,196.21	358.69	1,284.52	-116.66	10.68	-1.91	-23.18
6,589.00	34.02	19.97	6,278.93	396.28	1,310.83	-90.74	19.53	8.23	-35.99
6,683.00	40.35	8.98	6,353.86	451.17	1,324.59	-44.22	9.74	6.73	-11.69
6,778.00	42.59	7.75	6,425.04	513.40	1,333.73	10.82	2.51	2.36	-1.29



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Well Ten High 1N-18HM (S)

Survey

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6,873.00	46.59	1.77	6,492.71	579.80	1,339.13	71.06	6.10	4.21	-6.29
6,967.00	49.19	357.73	6,555.75	649.50	1,338.78	136.42	4.22	2.77	-4.30
7,062.00	48.53	357.47	6,618.25	720.98	1,335.78	204.38	0.72	-0.69	-0.27
7,156.00	50.51	358.94	6,679.27	792.39	1,332.29	272.44	2.15	2.11	-0.56
7,251.00	57.19	352.46	6,735.30	868.69	1,325.09	346.38	7.99	7.03	-4.72
7,346.00	62.15	349.20	6,783.27	949.59	1,311.97	426.72	6.00	5.22	-3.43
7,441.00	67.91	344.28	6,823.38	1,033.32	1,292.15	512.07	7.67	6.06	-5.18
7,535.00	74.15	341.47	6,853.92	1,118.21	1,265.95	600.75	7.21	6.64	-2.99
7,630.00	78.59	337.60	6,876.31	1,204.66	1,233.65	693.03	6.12	4.67	-4.07
7,724.00	82.07	332.59	6,892.11	1,288.66	1,194.63	785.39	6.43	3.70	-5.33
7,819.00	86.37	329.52	6,901.68	1,371.33	1,148.90	878.87	5.55	4.53	-3.23
7,914.00	89.05	330.75	6,905.47	1,453.64	1,101.63	972.56	3.10	2.82	1.29
8,008.00	91.34	330.57	6,905.15	1,535.58	1,055.58	1,065.46	2.44	2.44	-0.19
8,103.00	92.13	330.04	6,902.28	1,618.06	1,008.54	1,159.23	1.00	0.83	-0.56
8,197.00	92.57	329.96	6,898.42	1,699.40	961.58	1,251.89	0.48	0.47	-0.09
8,292.00	92.13	329.69	6,894.53	1,781.46	913.87	1,345.50	0.54	-0.46	-0.28
8,387.00	90.07	330.57	6,892.70	1,863.82	866.57	1,439.24	2.36	-2.17	0.93
8,482.00	89.89	330.31	6,892.74	1,946.45	819.70	1,533.08	0.33	-0.19	-0.27
8,576.00	89.23	330.40	6,893.46	2,028.15	773.21	1,625.92	0.71	-0.70	0.10
8,671.00	90.29	330.22	6,893.86	2,110.67	726.15	1,719.73	1.13	1.12	-0.19
8,765.00	91.03	330.66	6,892.77	2,192.43	679.78	1,812.58	0.92	0.79	0.47
8,859.00	92.13	330.22	6,890.18	2,274.16	633.43	1,905.40	1.26	1.17	-0.47
8,954.00	93.58	329.43	6,885.45	2,356.19	585.74	1,998.96	1.74	1.53	-0.83
9,048.00	93.41	329.43	6,879.72	2,436.97	538.02	2,091.38	0.18	-0.18	0.00
9,142.00	93.45	328.81	6,874.10	2,517.50	489.86	2,183.71	0.66	0.04	-0.66
9,237.00	91.34	329.96	6,870.13	2,599.18	441.53	2,277.18	2.53	-2.22	1.21
9,332.00	90.77	329.87	6,868.38	2,681.37	393.92	2,370.87	0.61	-0.60	-0.09
9,426.00	90.51	331.19	6,867.33	2,763.20	347.67	2,463.74	1.43	-0.28	1.40
9,521.00	91.21	329.60	6,865.90	2,845.78	300.75	2,557.56	1.83	0.74	-1.67
9,616.00	90.64	330.04	6,864.37	2,927.90	253.00	2,651.23	0.76	-0.60	0.46
9,710.00	91.38	331.71	6,862.71	3,009.99	207.26	2,744.18	1.94	0.79	1.78
9,805.00	91.03	331.10	6,860.71	3,093.39	161.80	2,838.24	0.74	-0.37	-0.64
9,900.00	92.84	330.40	6,857.50	3,176.22	115.41	2,932.10	2.04	1.91	-0.74
9,994.00	92.48	330.57	6,853.14	3,257.94	69.15	3,024.87	0.42	-0.38	0.18
10,089.00	91.91	330.31	6,849.50	3,340.51	22.32	3,118.65	0.66	-0.60	-0.27
10,184.00	91.21	330.66	6,846.92	3,423.15	-24.47	3,212.47	0.82	-0.74	0.37
10,278.00	90.64	330.22	6,845.40	3,504.90	-70.84	3,305.31	0.77	-0.61	-0.47
10,373.00	91.87	330.04	6,843.32	3,587.26	-118.14	3,399.05	1.31	1.29	-0.19
10,468.00	91.34	330.13	6,840.66	3,669.57	-165.50	3,492.77	0.57	-0.56	0.09
10,562.00	93.01	330.31	6,837.09	3,751.10	-212.15	3,585.50	1.79	1.78	0.19
10,657.00	92.66	330.31	6,832.39	3,833.52	-259.14	3,679.20	0.37	-0.37	0.00
10,752.00	92.40	330.48	6,828.20	3,916.04	-306.03	3,772.94	0.33	-0.27	0.18
10,846.00	92.26	329.69	6,824.38	3,997.45	-352.87	3,865.63	0.85	-0.15	-0.84



Survey Report



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

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

Well Ten High 1N-18HM (S)
 RKB=1310+33 @ 1343.00usft (Nabors X08)
 RKB=1310+33 @ 1343.00usft (Nabors X08)
 Grid
 Minimum Curvature
 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)
10,941.00	92.18	331.80	6,820.70	4,080.27	-399.26	3,959.48	2.22	-0.08	2.22
11,035.00	91.87	332.51	6,817.37	4,163.33	-443.14	4,052.67	0.82	-0.33	0.76
11,130.00	91.74	332.68	6,814.38	4,247.63	-486.84	4,146.96	0.23	-0.14	0.18
11,224.00	91.56	333.47	6,811.68	4,331.40	-529.39	4,240.35	0.86	-0.19	0.84
11,318.00	91.08	331.98	6,809.51	4,414.93	-572.45	4,333.69	1.66	-0.51	-1.59
11,413.00	90.77	332.68	6,807.98	4,499.05	-616.56	4,427.96	0.81	-0.33	0.74
11,507.00	90.90	331.10	6,806.61	4,581.95	-660.85	4,521.14	1.69	0.14	-1.68
11,601.00	90.20	330.22	6,805.70	4,663.89	-706.90	4,614.05	1.20	-0.74	-0.94
11,695.00	91.25	330.66	6,804.51	4,745.64	-753.27	4,706.90	1.21	1.12	0.47
11,790.00	91.25	330.75	6,802.44	4,828.48	-799.74	4,800.79	0.09	0.00	0.09
11,885.00	92.04	330.22	6,799.72	4,911.11	-846.53	4,894.61	1.00	0.83	-0.56
11,980.00	92.13	330.48	6,796.26	4,993.62	-893.49	4,988.37	0.29	0.09	0.27
12,074.00	91.60	329.78	6,793.20	5,075.09	-940.28	5,081.10	0.93	-0.56	-0.74
12,169.00	92.31	329.69	6,789.96	5,157.09	-988.13	5,174.70	0.75	0.75	-0.09
12,264.00	91.56	329.43	6,786.75	5,238.95	-1,036.24	5,268.25	0.84	-0.79	-0.27
12,359.00	92.62	329.34	6,783.29	5,320.65	-1,084.58	5,361.75	1.12	1.12	-0.09
12,454.00	92.13	328.81	6,779.35	5,402.08	-1,133.36	5,455.13	0.76	-0.52	-0.56
12,548.00	91.47	328.29	6,776.40	5,482.23	-1,182.38	5,547.41	0.89	-0.70	-0.55
12,643.00	92.44	328.46	6,773.16	5,563.07	-1,232.17	5,640.61	1.04	1.02	0.18
12,737.00	93.32	330.31	6,768.43	5,643.86	-1,279.98	5,733.06	2.18	0.94	1.97
12,832.00	92.26	330.84	6,763.81	5,726.51	-1,326.59	5,826.83	1.25	-1.12	0.56
12,926.00	90.59	330.66	6,761.47	5,808.49	-1,372.51	5,919.73	1.79	-1.78	-0.19
13,021.00	90.33	330.84	6,760.71	5,891.38	-1,418.92	6,013.66	0.33	-0.27	0.19
13,116.00	91.21	330.48	6,759.43	5,974.18	-1,465.47	6,107.55	1.00	0.93	-0.38
13,211.00	90.59	331.54	6,757.94	6,057.27	-1,511.50	6,201.52	1.29	-0.65	1.12
13,305.00	89.98	331.10	6,757.47	6,139.73	-1,556.62	6,294.59	0.80	-0.65	-0.47
13,399.00	91.30	332.24	6,756.42	6,222.47	-1,601.22	6,387.73	1.86	1.40	1.21
13,494.00	91.08	331.71	6,754.45	6,306.31	-1,645.85	6,481.92	0.60	-0.23	-0.56
13,588.00	91.30	330.66	6,752.50	6,388.65	-1,691.14	6,574.94	1.14	0.23	-1.12
13,683.00	92.13	329.96	6,749.65	6,471.14	-1,738.17	6,668.71	1.14	0.87	-0.74
13,774.00	91.47	330.13	6,746.80	6,549.95	-1,783.59	6,758.46	0.75	-0.73	0.19
13,869.00	91.03	330.22	6,744.72	6,632.34	-1,830.83	6,852.21	0.47	-0.46	0.09
13,963.00	90.42	330.92	6,743.53	6,714.21	-1,877.01	6,945.09	0.99	-0.65	0.74
14,057.00	91.43	331.27	6,742.02	6,796.48	-1,922.44	7,038.10	1.14	1.07	0.37
14,152.00	91.74	331.54	6,739.39	6,879.86	-1,967.89	7,132.14	0.43	0.33	0.28
14,246.00	91.38	331.27	6,736.83	6,962.37	-2,012.86	7,225.20	0.48	-0.38	-0.29
14,340.00	91.08	330.66	6,734.81	7,044.53	-2,058.47	7,318.17	0.72	-0.32	-0.65
14,435.00	90.42	330.57	6,733.57	7,127.30	-2,105.08	7,412.05	0.70	-0.69	-0.09
14,529.00	91.56	331.10	6,731.94	7,209.37	-2,150.89	7,504.99	1.34	1.21	0.56
14,623.00	91.60	331.63	6,729.35	7,291.84	-2,195.92	7,598.04	0.57	0.04	0.56
14,717.00	91.08	332.15	6,727.15	7,374.73	-2,240.19	7,691.21	0.78	-0.56	0.55
14,812.00	91.91	333.12	6,724.68	7,459.07	-2,283.84	7,785.52	1.34	0.87	1.02
14,906.00	92.13	331.19	6,721.36	7,542.13	-2,327.72	7,878.71	2.07	0.23	-2.05



Survey Report



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

Local Co-ordinate Reference: Well Ten High 1N-18HM (S)
TVD Reference: RKB=1310+33 @ 1343.00usif (Nabors X08)
MD Reference: RKB=1310+33 @ 1343.00usif (Nabors X08)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Jul2216cdt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (%/100usif)	Build Rate (%/100usif)	Turn Rate (%/100usif)	
15,001.00	92.26	330.40	6,717.72	7,624.99	-2,374.04	7,972.57	0.84	0.14	-0.83	
15,095.00	91.47	328.99	6,714.66	7,706.10	-2,421.45	8,065.18	1.72	-0.84	-1.50	
15,189.00	92.00	333.03	6,711.82	7,788.27	-2,466.97	8,158.12	4.33	0.56	4.30	
15,284.00	91.16	332.42	6,709.20	7,872.67	-2,510.49	8,252.44	1.09	-0.88	-0.64	
15,378.00	90.59	332.24	6,707.76	7,955.91	-2,554.14	8,345.72	0.64	-0.61	-0.19	
15,472.00	91.12	332.33	6,706.36	8,039.12	-2,597.85	8,438.99	0.57	0.56	0.10	
15,567.00	90.81	331.63	6,704.76	8,122.97	-2,642.47	8,533.18	0.81	-0.33	-0.74	
15,661.00	90.15	331.63	6,703.97	8,205.68	-2,687.14	8,626.32	0.70	-0.70	0.00	
15,756.00	90.29	329.60	6,703.61	8,288.45	-2,733.75	8,720.21	2.14	0.15	-2.14	
15,850.00	91.03	328.55	6,702.52	8,369.08	-2,782.05	8,812.68	1.37	0.79	-1.12	
15,945.00	90.64	328.29	6,701.14	8,450.00	-2,831.80	8,905.94	0.49	-0.41	-0.27	
16,039.00	90.15	328.46	6,700.49	8,530.04	-2,881.08	8,998.21	0.55	-0.52	0.18	
16,134.00	90.33	328.99	6,700.09	8,611.24	-2,930.40	9,091.57	0.59	0.19	0.56	
16,228.00	90.51	329.08	6,699.40	8,691.84	-2,978.77	9,184.04	0.21	0.19	0.10	
16,322.00	91.91	329.78	6,697.42	8,772.75	-3,026.56	9,276.60	1.67	1.49	0.74	
16,417.00	91.52	329.87	6,694.58	8,854.84	-3,074.29	9,370.24	0.42	-0.41	0.09	
16,511.00	91.08	330.13	6,692.44	8,936.23	-3,121.28	9,462.96	0.54	-0.47	0.28	
16,606.00	90.77	330.31	6,690.91	9,018.67	-3,168.46	9,556.73	0.38	-0.33	0.19	
16,700.00	90.33	330.57	6,690.01	9,100.43	-3,214.83	9,649.59	0.54	-0.47	0.28	
16,795.00	91.08	330.40	6,688.84	9,183.10	-3,261.62	9,743.44	0.81	0.79	-0.18	
16,889.00	91.87	330.22	6,686.42	9,264.73	-3,308.17	9,836.23	0.86	0.84	-0.19	
16,984.00	91.82	330.84	6,683.36	9,347.39	-3,354.88	9,930.05	0.65	-0.05	0.65	
17,078.00	91.43	331.01	6,680.69	9,429.51	-3,400.54	10,022.99	0.45	-0.41	0.18	
17,172.00	90.90	331.10	6,678.78	9,511.76	-3,446.03	10,115.98	0.57	-0.56	0.10	
17,267.00	90.37	331.36	6,677.73	9,595.02	-3,491.75	10,210.02	0.62	-0.56	0.27	
17,361.00	90.07	331.01	6,677.37	9,677.38	-3,537.05	10,303.05	0.49	-0.32	-0.37	
17,455.00	91.08	330.75	6,676.43	9,759.50	-3,582.79	10,396.02	1.11	1.07	-0.28	
17,549.00	90.86	330.40	6,674.84	9,841.36	-3,628.97	10,488.90	0.44	-0.23	-0.37	
17,643.00	90.86	330.40	6,673.42	9,923.08	-3,675.39	10,581.73	0.00	0.00	0.00	
17,738.00	92.62	330.13	6,670.54	10,005.53	-3,722.49	10,675.49	1.87	1.85	-0.28	
17,832.00	92.40	328.99	6,666.42	10,086.50	-3,770.06	10,768.02	1.23	-0.23	-1.21	
17,925.00	92.75	328.29	6,662.24	10,165.83	-3,818.41	10,859.30	0.84	0.38	-0.75	
17,985.00	92.75	328.29	6,659.37	10,216.81	-3,849.91	10,918.11	0.00	0.00	0.00	
Survey @ 17925.00 MD 6662.24 TVD										
17,985.00		328.29	6,659.37	10,216.81	-3,849.91	10,918.11	0.00	0.00	0.00	
Survey projected to 17985.00 MD 6659.37 TVD										

Design Annotations	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
			+N/-S (usft)	+E/-W (usft)	
	189.00	189.00	-0.62	0.23	MWD surveys
	17,925.00	6,662.24	10,165.83	-3,818.41	Survey @ 17925.00 MD 6662.24 TVD
	17,985.00	6,659.37	10,216.81	-3,849.91	Survey projected to 17985.00 MD 6659.37 TVD



Survey Report - Geographic



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

Local Co-ordinate Reference:
TVD Reference: Well Ten High 1N-18HM (S)
MD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
North Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
Survey Calculation Method: Grid
Database: Minimum Curvature
 DB_Jul2216dct_v14

Project Marshall County, West Virginia.

Map System: Universal Transverse Mercator (US Survey Feet)
Geo Datum: NAD83 West Virginia - HARN
Map Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level

Site Ten High

Site Position: Northing: 14,456,545.60 usft Latitude: 39.80681659
 From: Lat/Long Easting: 1,730,001.41 usft Longitude: -80.68105346
Position Uncertainty: 0.00 usft Slot Radius: 13-3/16 " Grid Convergence: 0.20 °

Well Ten High 1N-18HM (S)

Well Position +N/-S 0.00 usft Northing: 14,456,548.38 usft Latitude: 39.80681659
 +E/-W 0.00 usft Easting: 1,729,989.23 usft Longitude: -80.68105346
Position Uncertainty 0.00 usft Wellhead Elevation: usft Ground Level: 1,310.00 usft

Wellbore	Original Hole
Magnetics	
Model Name	IGRF2015
Sample Date	9/1/2018
Declination (°)	-8.75
Dip Angle (°)	66.87
Field Strength (nT)	52,041,11138479

Design Surveys Original Hole

Audit Notes:

Version: 1.0 **Phase:** ACTUAL **Tie On Depth:** 0.00

Vertical Section: Depth From (TVD) +N/-S (usft) +E/-W (usft) Direction (°) 0.00 0.00 339.38

Survey Program	Date	11/27/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
189.00	1,112.00	MWD 17 1/2 (Original Hole)	MWD	MWD - Standard
1,165.00	6,188.00	MWD 8 3/4 (Original Hole)	MWD	MWD - Standard
6,267.00	17,925.00	MWD (Original Hole)	MWD	MWD - Standard
17,985.00	17,985.00	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	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
	189.00	0.40	160.01	189.00	-0.62	0.23	14,456,547.76	1,729,989.46	39.80681489	-80.68105267	
	MWD surveys										
	220.00	0.57	206.31	220.00	-0.86	0.19	14,456,547.52	1,729,989.42	39.80681423	-80.68105278	
	252.00	0.50	122.40	252.00	-1.08	0.24	14,456,547.30	1,729,989.47	39.80681363	-80.68105261	
	284.00	0.07	216.53	284.00	-1.17	0.35	14,456,547.21	1,729,989.58	39.80681338	-80.68105224	
	315.00	0.69	194.07	315.00	-1.36	0.29	14,456,547.01	1,729,989.52	39.80681284	-80.68105244	
	347.00	0.28	237.90	346.99	-1.59	0.18	14,456,546.78	1,729,989.41	39.80681222	-80.68105285	
	371.00	0.21	197.07	370.99	-1.67	0.12	14,456,546.71	1,729,989.35	39.80681202	-80.68105307	



Survey Report - Geographic



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

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

Well Ten High 1N-18HM (S)
RKB=1310+33 @ 1343.00usft (Nabors X0B)
RKB=1310+33 @ 1343.00usft (Nabors X0B)
Grid
Minimum Curvature
DB_Jul2216dt_v14

Table with columns: Measured Depth (usft), Inclination (°), Azimuth (°), Vertical Depth (usft), +N/S (usft), +E/W (usft), Map Northing (usft), Map Easting (usft), Latitude, Longitude. Contains 40 rows of survey data.



Survey Report - Geographic



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

Local Co-ordinate Reference:
TVD Reference: Well Ten High 1N-18HM (S)
MD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
North Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
Survey Calculation Method: Grid
Database: Minimum Curvature
 DB_Jul2216dct_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/S (usft)	+E/W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,009.00	11.54	73.00	3,994.71	156.36	177.93	14,456,704.74	1,730,167.16	39.80724425	-80.68041792
4,103.00	13.99	74.34	4,086.38	162.18	197.86	14,456,710.55	1,730,187.09	39.80726003	-80.68034686
4,198.00	15.37	78.57	4,178.28	167.77	221.26	14,456,716.15	1,730,210.49	39.80727617	-80.68026348
4,293.00	17.04	86.51	4,269.51	171.11	247.50	14,456,719.49	1,730,236.73	39.80728409	-80.68017000
4,387.00	20.48	87.91	4,358.51	172.55	277.69	14,456,720.93	1,730,266.92	39.80728774	-80.68006249
4,482.00	22.81	84.76	4,446.80	174.84	312.64	14,456,723.22	1,730,301.87	39.80729368	-80.67993900
4,576.00	25.13	81.90	4,532.69	179.32	350.55	14,456,727.70	1,730,339.79	39.80730561	-80.67980295
4,671.00	27.86	82.20	4,617.71	185.17	392.53	14,456,733.55	1,730,381.76	39.80732128	-80.67965343
4,766.00	29.75	77.68	4,700.96	193.22	437.55	14,456,741.60	1,730,426.79	39.80734292	-80.67949299
4,860.00	29.37	75.94	4,782.73	203.79	482.70	14,456,752.17	1,730,471.93	39.80737152	-80.67933210
4,955.00	30.06	74.29	4,865.24	215.90	528.21	14,456,764.27	1,730,517.44	39.80740431	-80.67916992
5,049.00	31.73	76.42	4,945.90	228.08	574.90	14,456,776.45	1,730,564.13	39.80743730	-80.67900350
5,144.00	30.32	84.48	5,027.34	236.25	623.07	14,456,784.63	1,730,612.30	39.80745928	-80.67883186
5,239.00	30.70	83.44	5,109.19	241.33	671.04	14,456,799.71	1,730,660.27	39.80747275	-80.67866101
5,333.00	32.05	82.92	5,189.44	247.15	719.63	14,456,795.52	1,730,708.86	39.80748824	-80.67848792
5,428.00	29.72	78.74	5,270.97	254.85	767.75	14,456,803.23	1,730,756.98	39.80750893	-80.67746491
5,522.00	30.38	75.73	5,352.34	265.26	813.64	14,456,813.64	1,730,802.87	39.80753707	-80.67729842
5,620.00	31.00	77.43	5,436.62	276.86	862.29	14,456,825.24	1,730,851.52	39.80756844	-80.67715293
5,715.00	31.65	81.41	5,517.78	285.91	910.82	14,456,834.29	1,730,900.05	39.80759281	-80.67700664
5,809.00	30.68	82.61	5,598.21	292.68	958.99	14,456,841.06	1,730,948.22	39.80761092	-80.67697955
5,904.00	30.25	82.37	5,680.10	298.97	1,006.74	14,456,847.35	1,730,995.97	39.80762774	-80.67683503
5,998.00	30.00	81.91	5,761.40	305.43	1,053.47	14,456,853.80	1,731,042.71	39.80764499	-80.67670118
6,093.00	29.37	80.78	5,843.93	312.50	1,099.98	14,456,860.88	1,731,089.21	39.80766396	-80.67656172
6,188.00	29.40	79.65	5,926.71	320.42	1,145.92	14,456,868.80	1,731,135.15	39.80768626	-80.67642784
6,287.00	28.78	78.59	5,995.75	327.67	1,183.64	14,456,876.05	1,731,172.87	39.80770479	-80.67629783
6,305.00	29.32	78.94	6,028.97	331.26	1,201.73	14,456,879.64	1,731,190.96	39.80771448	-80.67627773
6,400.00	28.00	75.95	6,112.33	341.14	1,246.20	14,456,889.52	1,731,235.43	39.80774116	-80.67627810
6,494.00	26.20	54.16	6,196.21	358.69	1,284.52	14,456,907.07	1,731,273.75	39.80778998	-80.67628784
6,589.00	34.02	19.97	6,278.93	396.28	1,310.83	14,456,944.65	1,731,300.06	39.80781916	-80.67629935
6,683.00	40.35	8.98	6,353.86	451.17	1,324.59	14,456,999.54	1,731,313.82	39.80804254	-80.67633117
6,778.00	42.59	7.75	6,425.04	513.40	1,333.73	14,457,081.78	1,731,322.96	39.80821337	-80.67629783
6,873.00	46.59	1.77	6,492.71	579.80	1,339.13	14,457,128.18	1,731,328.36	39.80839567	-80.67627773
6,967.00	49.19	357.73	6,555.75	649.50	1,338.78	14,457,197.88	1,731,328.01	39.80858708	-80.67627810
7,062.00	48.53	357.47	6,618.25	720.98	1,335.78	14,457,269.36	1,731,325.01	39.80878342	-80.67628784
7,156.00	50.51	356.94	6,679.27	792.39	1,332.29	14,457,340.77	1,731,321.52	39.80897956	-80.67629935
7,251.00	57.19	352.46	6,735.30	868.69	1,325.09	14,457,417.07	1,731,314.32	39.80918916	-80.67632403
7,346.00	62.15	349.20	6,793.27	949.59	1,311.97	14,457,497.96	1,731,301.20	39.80941145	-80.67636970
7,441.00	67.91	344.28	6,823.38	1,033.32	1,292.15	14,457,581.70	1,731,281.38	39.80964160	-80.67643920
7,535.00	74.15	341.47	6,853.92	1,118.21	1,265.95	14,457,666.59	1,731,255.18	39.80987499	-80.67653140
7,630.00	78.59	337.60	6,876.31	1,204.66	1,253.65	14,457,753.04	1,731,222.89	39.81011272	-80.67664528
7,724.00	82.07	332.59	6,892.11	1,288.66	1,194.63	14,457,837.03	1,731,183.86	39.81034378	-80.67678315
7,819.00	86.37	329.52	6,901.68	1,371.33	1,148.90	14,457,919.71	1,731,138.13	39.81057128	-80.67711219
7,914.00	89.05	330.75	6,905.47	1,453.64	1,101.63	14,458,002.02	1,731,090.87	39.81079779	-80.67727513
8,008.00	91.34	330.57	6,905.15	1,535.58	1,055.58	14,458,083.95	1,731,044.81	39.81102327	-80.67744158
8,103.00	92.13	330.04	6,902.28	1,618.06	1,008.54	14,458,166.44	1,730,997.77	39.81125026	-80.67760776
8,197.00	92.57	329.96	6,898.42	1,699.40	961.58	14,458,247.78	1,730,950.81	39.81147409	-80.67760776
8,292.00	92.13	329.69	6,894.53	1,781.46	913.87	14,458,329.84	1,730,903.10	39.81169992	-80.67777660
8,387.00	90.07	330.57	6,892.70	1,863.82	866.57	14,458,412.20	1,730,855.80	39.81192666	-80.67794398
8,482.00	89.89	330.31	6,892.74	1,946.45	819.70	14,458,494.83	1,730,808.93	39.81215396	-80.67810992
8,576.00	89.23	330.40	6,893.46	2,028.15	773.21	14,458,576.52	1,730,762.44	39.81237877	-80.67827433
8,671.00	90.29	330.22	6,893.86	2,110.67	726.15	14,458,659.05	1,730,715.38	39.81260587	-80.67844083
8,765.00	91.03	330.66	6,892.77	2,192.43	679.78	14,458,740.81	1,730,669.01	39.81283086	-80.67860491
8,859.00	92.13	330.22	6,890.18	2,274.16	633.43	14,458,822.54	1,730,622.66	39.81305577	-80.67876894
8,954.00	93.58	329.43	6,885.45	2,356.19	585.74	14,458,904.56	1,730,574.97	39.81328149	-80.67893771
9,048.00	93.41	329.43	6,879.72	2,436.97	538.02	14,458,985.35	1,730,527.25	39.81350382	-80.67910661



Survey Report - Geographic



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

Local Co-ordinate Reference: Well Ten High 1N-18HM (S)
TVD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
MD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Jul2216dt_v14

Table with columns: Measured Depth (usft), Inclination (°), Azimuth (°), Vertical Depth (usft), +N/-S (usft), +E/W (usft), Map Northing (usft), Map Easting (usft), Latitude, Longitude. Contains 40 rows of survey data.



Survey Report - Geographic



Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia.
Site: Ten High
Well: Ten High 1N-18HM (S)
Wellbore: Original Hole
Design: Surveys Original Hole

Local Co-ordinate Reference: Well Ten High 1N-18HM (S)
TVD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
MD Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Jul2216ct_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,340.00	91.08	330.66	6,734.81	7,044.53	-2,058.47	14,463,592.91	1,727,930.76	39,82618249	-80.68829571
14,435.00	90.42	330.57	6,733.57	7,127.30	-2,105.08	14,463,675.68	1,727,984.15	39,82641024	-80.68846070
14,529.00	91.56	331.10	6,731.94	7,209.37	-2,150.89	14,463,757.75	1,727,938.35	39,82663606	-80.68862281
14,623.00	91.60	331.63	6,729.35	7,291.84	-2,195.92	14,463,840.22	1,727,793.32	39,82686297	-80.68878217
14,717.00	91.08	332.15	6,727.15	7,374.73	-2,240.19	14,463,923.11	1,727,749.04	39,82709103	-80.68893885
14,812.00	91.91	333.12	6,724.68	7,459.07	-2,283.84	14,464,007.45	1,727,705.39	39,82732306	-80.68909328
14,906.00	92.13	333.19	6,721.36	7,542.13	-2,327.72	14,464,090.51	1,727,661.51	39,82755158	-80.68924853
15,001.00	92.26	330.40	6,717.72	7,624.99	-2,374.04	14,464,173.37	1,727,615.19	39,82777958	-80.68941249
15,095.00	91.47	328.99	6,714.66	7,706.10	-2,421.45	14,464,254.48	1,727,567.78	39,82800278	-80.68958034
15,189.00	92.00	333.03	6,711.82	7,788.27	-2,466.97	14,464,336.65	1,727,522.26	39,82822886	-80.68974148
15,284.00	91.16	332.42	6,709.20	7,872.67	-2,510.49	14,464,421.05	1,727,478.74	39,82846107	-80.68989544
15,378.00	90.59	332.24	6,707.76	7,955.91	-2,554.14	14,464,504.29	1,727,435.09	39,82869008	-80.68999900
15,472.00	91.12	332.33	6,706.36	8,039.12	-2,597.85	14,464,587.50	1,727,391.38	39,82889190	-80.69020454
15,567.00	90.81	331.63	6,704.76	8,122.97	-2,642.47	14,464,671.35	1,727,346.76	39,82914970	-80.69045051
15,661.00	90.15	331.63	6,703.97	8,205.68	-2,687.14	14,464,754.06	1,727,302.09	39,82937726	-80.69052051
15,756.00	90.29	329.80	6,703.61	8,288.45	-2,733.75	14,464,836.83	1,727,255.48	39,82960501	-80.69068652
15,850.00	91.03	328.55	6,702.52	8,369.08	-2,782.05	14,464,917.46	1,727,207.18	39,82982690	-80.69085658
15,945.00	90.64	328.29	6,701.14	8,450.00	-2,831.80	14,464,998.38	1,727,157.43	39,83004961	-80.69103277
16,039.00	90.15	328.46	6,700.49	8,530.04	-2,881.08	14,465,078.42	1,727,108.15	39,83026988	-80.69120735
16,134.00	90.33	328.99	6,700.09	8,611.24	-2,930.40	14,465,159.61	1,727,058.83	39,83049332	-80.69138202
16,228.00	90.51	329.08	6,699.40	8,691.84	-2,978.77	14,465,240.22	1,727,010.47	39,83071513	-80.69155329
16,322.00	91.91	329.76	6,697.42	8,772.75	-3,026.56	14,465,321.13	1,726,962.67	39,83093779	-80.69172255
16,417.00	91.52	329.87	6,694.58	8,854.84	-3,074.29	14,465,403.22	1,726,914.94	39,83116368	-80.69189155
16,511.00	91.08	330.13	6,692.44	8,936.23	-3,121.28	14,465,484.60	1,726,867.95	39,83138763	-80.69205792
16,606.00	90.77	330.31	6,690.91	9,018.67	-3,168.46	14,465,567.05	1,726,820.77	39,83161448	-80.69222495
16,700.00	90.33	330.57	6,690.01	9,100.43	-3,214.83	14,465,648.81	1,726,774.40	39,83183946	-80.69238913
16,795.00	91.08	330.40	6,688.84	9,183.10	-3,261.62	14,465,731.47	1,726,727.61	39,83206691	-80.69255481
16,889.00	91.87	330.22	6,686.42	9,264.73	-3,308.17	14,465,813.11	1,726,681.06	39,83229153	-80.69271960
16,984.00	91.82	330.84	6,683.36	9,347.39	-3,354.88	14,465,895.77	1,726,634.35	39,83251899	-80.69288498
17,078.00	91.43	331.01	6,680.69	9,429.51	-3,400.54	14,465,977.89	1,726,588.69	39,83274495	-80.69304662
17,172.00	90.90	331.10	6,678.78	9,511.76	-3,446.03	14,466,060.13	1,726,543.21	39,83297123	-80.69320763
17,267.00	90.37	331.36	6,677.73	9,595.02	-3,491.75	14,466,143.40	1,726,497.49	39,83320033	-80.69336947
17,361.00	90.07	331.01	6,677.37	9,677.38	-3,537.05	14,466,225.76	1,726,452.18	39,83342694	-80.69352985
17,455.00	91.08	330.75	6,676.43	9,759.50	-3,582.79	14,466,307.87	1,726,406.44	39,83365287	-80.69369178
17,549.00	90.86	330.40	6,674.84	9,841.36	-3,628.97	14,466,389.74	1,726,360.26	39,83387812	-80.69385526
17,643.00	90.86	330.40	6,673.42	9,923.08	-3,675.39	14,466,471.46	1,726,313.84	39,83410288	-80.69401964
17,738.00	92.62	330.13	6,670.54	10,005.53	-3,722.49	14,466,553.91	1,726,266.74	39,83432985	-80.69418639
17,832.00	92.40	328.99	6,666.42	10,086.50	-3,770.06	14,466,634.87	1,726,219.17	39,83455264	-80.69435488
17,925.00	92.75	328.29	6,662.24	10,165.83	-3,818.41	14,466,714.21	1,726,170.82	39,83477097	-80.69452614
Survey @ 17925.00 MD 6662.24 TVD									
17,985.00	92.75	328.29	6,659.37	10,216.81	-3,849.91	14,466,765.19	1,726,139.32	39,83491128	-80.69463774
Survey projected to 17985.00 MD 6659.37 TVD									

Design Annotations	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N-S (usft)	Local Coordinates +E-W (usft)	Comment
	189.00	189.00	-0.62	0.23	MWD surveys
	17,925.00	6,662.24	10,165.83	-3,818.41	Survey @ 17925.00 MD 6662.24 TVD
	17,985.00	6,659.37	10,216.81	-3,849.91	Survey projected to 17985.00 MD 6659.37 TVD